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PARAMOUNT HB ET AL CAMERON
J-62 - N.W.T.
DELIVERABILITY TEST
SULPHUR POINT FEBRUARY, 1981

**MICROFILMED
SUR MICROFILM:**

Macdonald Engineering & Associates (1980) Ltd.

200, 1301 - 8TH STREET S.W.
CALGARY, ALBERTA, CANADA T2R 1B7
TELEPHONE: (403) 245-6851

May 7, 1982

Paramount Resources Ltd.
600, 805-8th Avenue S.W.
Calgary, Alberta T2P 1H7

Attention: Mr. Dave Monachello, P. Geol.

Dear Sir:

A deliverability test was conducted on PARAMOUNT HB ET AL CAMERON J-62-N.W.T. from February 7 to February 16, 1981 by TESTMASTER PRODUCTION SERVICES LTD.

The well was flowed from the SULPHUR POINT formation through 73.0 mm tubing and a portable well testing facility to obtain a four point and modified isochronal deliverability test.

Gas flow rates were calculated in accordance with AGA Report #5 using the standard conditions of 101.325 kPa and 15°C.

The subsurface pressures were measured directly by ALMECH SUBSURFACE TOOLS (1976) LTD. utilizing tandem recorders set at 1371.26 m KB. The measured gauge pressures were converted to absolute pressures by assuming a barometric pressure of 101.3 kPa. These measurements were then extrapolated to the mid-point of the producing interval at 1386.75 m KB.

Build-up data was analyzed by the Horner method and the values of kh , s' and $\bar{P}_R$ derived from that analysis have been used for all other calculations.

RESULTS DETERMINED FROM THE TEST DATA

	<u>METRIC(SI) UNITS</u>	<u>FIELD UNITS</u>
Absolute Open Flow Potential	58.00x10 ³ m ³ /D	2.059 MMCF/D
Wellhead Open Flow Potential	56.00x10 ³ m ³ /D	1.988 MMCF/D
Stabilized Wellhead Open Flow Potential	50.00x10 ³ m ³ /D	1.775 MMCF/D
Average Reservoir Pressure, $\bar{P}_R$	9710.5 kPaa	1408.3 psia
Compressibility Factor, $\bar{Z}$ at $\bar{P}$	0.894	0.894
Formation Flow Capacity, kh	34.751 mD.m	114.012 md.ft.
Average Effective Permeability, k	3.407 mD.	3.452 md.
Apparent Skin Factor, s' at 47103.3 m ³ /D, indicating a damaged formation	+3.018	+3.018
Flow Efficiency	70.8 %	70.8 %
Approximate Radius of Investigation	133.3 meters	437.3 feet
Total Gas Produced During Test	108860.7 m ³	3.864 MMCF
Approx. Water Produced During Test	0.225 m ³	1.42 Bbls.
Approx. Condensate Produced During Test	Trace	Trace

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PARAMOUNT HB ET AL CAMERON J-62-N.W.T.

Extrapolation of the Horner Build-up plot indicates that the well will return to the initial shut-in pressure, therefore there does not appear to be reservoir depletion.

The deliverability plots utilized a line of forty five degree slope. A line of this slope was drawn through the extended run point to determine the deliverability.

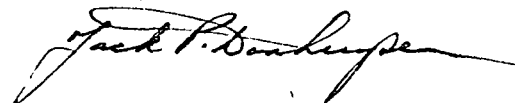
The calculated flow efficiency being less than unity indicates that the productivity of the well can be increased by approximately 1.4 times upon re-completion.

Gas, condensate, oil and water samples were obtained during the test and forwarded to Chemex Labs (Alberta) Ltd. for analysis. A copy of their analysis is included in this report. H₂S was determined by a Tutweiler test on site as 0.68%, therefore N₂ and CO₂ were adjusted accordingly as 4.42% and 3.51% respectively, and used for the calculations in the build-up analysis.

If you have any questions, please feel free to contact the undersigned at 245-6851.

Yours truly,

MACDONALD ENGINEERING & ASSOCIATES (1980) LTD.



Jack P. Donhuysen, C.E.T.

PARAMOUNT HB ET AL CAMERON
J-62 - N.W.T.

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PARAMOUNT HB ET AL CAMERON
J-62-N.W.T.INTRODUCTION

A four point, 2.0 hours/point, modified isochronal deliverability test, followed by a 48.17 hour extended run, was conducted from February 7 to February 16, 1981, by TESTMASTER PRODUCTION SERVICES LTD. on the well PARAMOUNT HB ET AL CAMERON J-62-N.W.T.

Gas was produced from the SULPHUR POINT formation at a mean formation depth of 1386.75 mKB through 73.0 mm tubing to surface. Gas volumes were measured through a 73.53 mm meter run. Liquid production was measured in a 64 m³ test tank.

Subsurface pressures were observed with a dead weight gauge while subsurface conditions were recorded at 1371.26 m KB throughout the test and build-up periods.

Duplicate gas, condensate, oil and water samples were obtained during the extended run for laboratory analysis. H₂S was determined by a Tutweiler test on site as 9.68%, therefore N₂ and CO₂ were adjusted accordingly as 4.42% and 3.51% respectively, and used for the calculations in the build-up analysis.

PROCEDURE

The well has been shut-in as of February 1, 1981.

A static gradient survey was run prior to opening the well on test. Subsurface pressure recorders were run to 1371.26 mKB prior to commencing the test. The four point, 2.0 hours/point, modified isochronal deliverability test was conducted. The fourth point was extended for 48.17 hours. Following the extended run, the well was shut-in and the subsurface pressure build-up was recorded for 97.0 hours. Following this build-up period, a final static gradient survey was conducted.

DISCUSSION

All flow rates were calculated in accordance with AGA report #5. Static and flowing bottomhole pressures were obtained from the subsurface pressure recorders at 1371.26 m KB and extrapolated to MPP at 1386.75 m KB. The static reservoir pressure was calculated from the shut-in bottomhole pressure and the static gradient run prior to the test and confirmed by the Horner build-up plot. The AOF curve plotted on page 3 utilized a line of 45° slope in accordance with E.R.C.B. 75-34 as the slope of the isochronal points was less than 45°. A line of this slope was drawn through the extended run point to determine the AOF.

A Wellhead Open Flow Potential was plotted in a similar manner on page 4.

A Wellhead Deliverability curve is plotted on page 6 to enable one to predict the flow rate at various wellhead pressures.

A Stabilized Wellhead Deliverability curve is plotted on page 8 to enable one to predict the flow rate at various wellhead pressures. The Stabilized Deliverability curve is based on a theoretical flow rate calculation as shown in the build-up analysis.

A Pressure Drawdown and a Horner Build-up plot are presented on pages 9 and 10 respectively.

RESULTS

1.3

	<u>METRIC(SI) UNITS</u>	<u>FIELD UNITS</u>
1. Absolute Open Flow		
- Q	$58.00 \times 10^3 \text{ m}^3/\text{D}$	2.059 MMCF/D
- n	1.000	1.000
- c	$6.151 \times 10^{-4} \text{ m}^3/\text{D/kPaa}^2$	$1.038 \times 10^{-6} \text{ MMCF/D/psia}^2$
2. Wellhead Open Flow Potential		
- Q	$56.00 \times 10^3 \text{ m}^3/\text{D}$	1.988 MMCF/D
- Q_{st}	$50.00 \times 10^3 \text{ m}^3/\text{D}$	1.775 MMCF/D
3. Reservoir Conditions		
- Pressure, $\bar{P}_R$	9710.5 kPaa	1408.3 psia
- Temperature	55.6 °C	132.1 °F
4. Final Flow Conditions		
- Q	$47103.3 \text{ m}^3/\text{D}$	1.672 MMCF/D
- Tubing Wellhead Pressure	3596.0 kPaa	521.5 psia
5. Total Gas Produced	108860.7 m^3	3.864 MMCF
Total Condensate Produced	Trace	Trace
Total Water Produced	0.225 m^3	1.42 Bbls.
6. Wellbore problems were apparent over the test range.		

All data pertaining to the above results can be found in the following report.

SIGNED: Richard G. Nygren
Richard G. Nygren

Field Data
Pressure
AOF &
Deliverability
Analysis
Flow Rate
Calculations

SUMMARY BACK PRESSURE TEST DATA

2.

WELL: PARAMOUNT HB ET AL CAMERON LOCATION: J-62-N.W.T. FIELD: CAMERON HILLS
 FORMATION: SULPHUR POINT DATE OF TEST: FEBRUARY 7-16, 1981
 TUBING: 73.0mm set at 1381.56m KB CASING: 139.7mm set at 1605.0m KB
 PRODUCED THROUGH: TUBING PERFORATIONS: 1384.5m to 1386.75m KB
1389.0m KB
 GAS: Stage 1 - S.G. 0.626 Stage 2 - S.G. 1384.4-1385.9 LF
 LIQUID: Stage 1 - S.G. Mol. Mass
 Stock Tank - S.G. Mol. Mass
 METER SIZE: 73.53 mm RECORDER RUN DEPTH: 1371.25m KB

Run	Dur. of Run h	WELLHEAD DATA				METER DATA				Press. @ Run Depth kPaa
		Choke Size mm	Temp. °C	Tbg. Press. kPaa	Csg. Press. kPaa	Plate Size mm	Static Press. kPaa	Diff. kPa	MR Temp. °C	
ISI	2.00			8501						9624.0
#1	2.00	4.76	-2.0	6551		25.4	1859	16.0	42.0	7555.3
SI	2.00			8386						9514.9
#2	2.00	7.14	1.0	5246		25.4	1652	38.0	40.0	6550.5
SI	2.00			8301						9499.5
#3	2.00	9.53	2.0			34.9	1963	17.0	40.0	4874.3
SI	2.00									9603.5
#4	2.00	9.53	3.0	3301		38.1	1963	16.0	33.0	4585.7
EXT	48.17	9.53	10.0	3596		38.1	1411	17.0	40.0	4255.2
SI	97.00									9594.3
FSI				**8501						

**Final shut-in pressure same as initial shut-in pressure

WELL EFFLUENT: S.G.

P_c

T_c

Run	Total Flow Rate m³/d	SANDFACE PRESSURE			SURFACE PRESSURE		cond. Prod. m³/d	C.G.R. x10⁵	Water Prod. m³/d
		P _f or P _s kPaa	P _f ² or P _s ² x10⁻⁴ kPaa²	P _f ²-P _s ² x10⁻⁴ kPaa²	P _w ² or P _d ² x10⁻⁴ kPaa²	P _w ²-P _d ² x10⁻⁴ kPaa²			
ISI		9710.5	9429.4		7226.7				
#1	22412.5	7577.2	5741.4	3688.0	4291.6	2935.1			
SI		9536.8	9095.1		7032.5				
#2	32694.8	6572.4	4319.6	4775.5	2752.1	4280.4			
SI		9521.4	9065.7		6890.7				
#3	46185.0	4896.2	2397.3	6668.4					1.80
SI		9625.4	9264.8						
#4	54798.5	4607.6	2123.0	7141.8	1089.7				
EXT	47103.3	4277.1	1829.4	7600.0	1293.1	5933.6			0.37
FSI		*9710.5	9429.4		7226.7				

*Final shut-in pressure same as initial shut-in pressure and confirmed by the Horner build-up plot.

AOF 58.00 x 10³ m³/D

"n" 1.000

C 6.151 x 10⁻⁴ m³/D/kPaa²

REMARKS:

BOTTOM HOLE PRESSURE: *9710.5 kPaa

BOTTOM HOLE TEMPERATURE: 55.6 °C

TOTAL GAS PRODUCTION: 108860.7 m³

TOTAL WATER PRODUCTION: 0.225 m³

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PARAMOUNT HB ET AL CAMERON

J-62 - N.W.T.

AOF CURVE

SULPHUR POINT

FEBRUARY, 1981

$$AOF = 58.00 \times 10^3 \text{ m}^3/\text{D}$$

$$n = 1.000$$

$$c = 6.151 \times 10^{-4} \text{ m}^3/\text{D}/\text{kPaa}^2$$

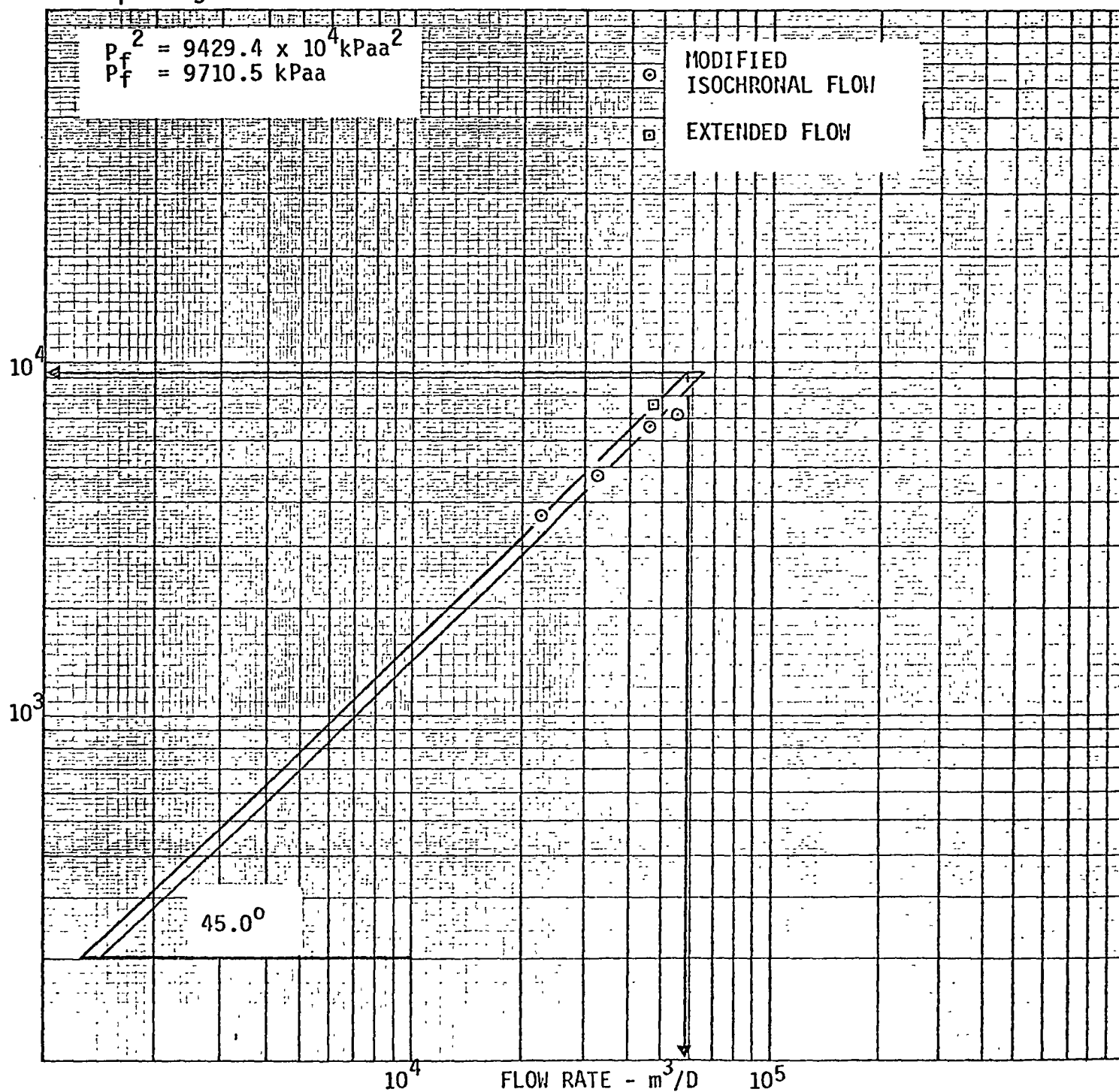
$$(P_f^2 - P_s^2) \times 10^{-4} \text{ kPaa}^2$$

$$P_f^2 = 9429.4 \times 10^4 \text{ kPaa}^2$$

$$P_s = 9710.5 \text{ kPaa}$$

MODIFIED
ISOCHRONAL FLOW

EXTENDED FLOW



WELLHEAD OPEN FLOW POTENTIAL =
 $56.00 \times 10^3 \text{ m}^3/\text{D}$

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PARAMOUNT HB ET AL CAMERON
 J-62 - N.W.T.

WELLHEAD OPEN FLOW POTENTIAL
 SULPHUR POINT FEBRUARY, 1981

$$(P_w^2 - P_d^2) \times 10^{-4} \text{ kPaa}^2$$

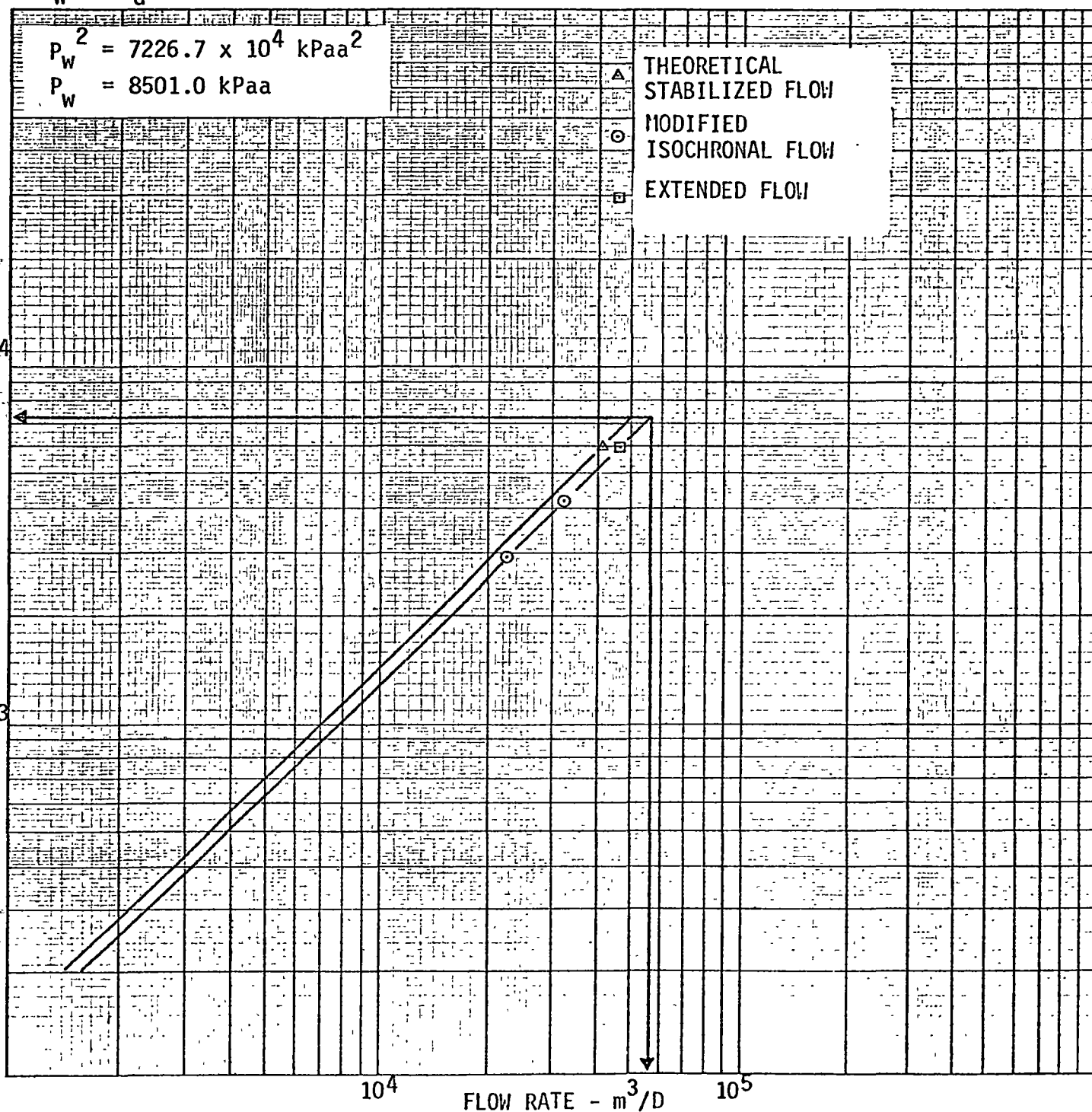
$$P_w^2 = 7226.7 \times 10^4 \text{ kPaa}^2$$

$$P_w = 8501.0 \text{ kPaa}$$

THEORETICAL
 STABILIZED FLOW
 MODIFIED
 ISOCHRONAL FLOW
 EXTENDED FLOW

 10^4
 10^3
 10^4

FLOW RATE - m^3/D

 10^5


PARAMOUNT HB ET AL CAMERON
J-62 - N.W.T.

DELIVERABILITY CURVE DATA
SULPHUR POINT FEBRUARY, 1982

$$Q = c(P_w^2 - P_d^2)^n$$

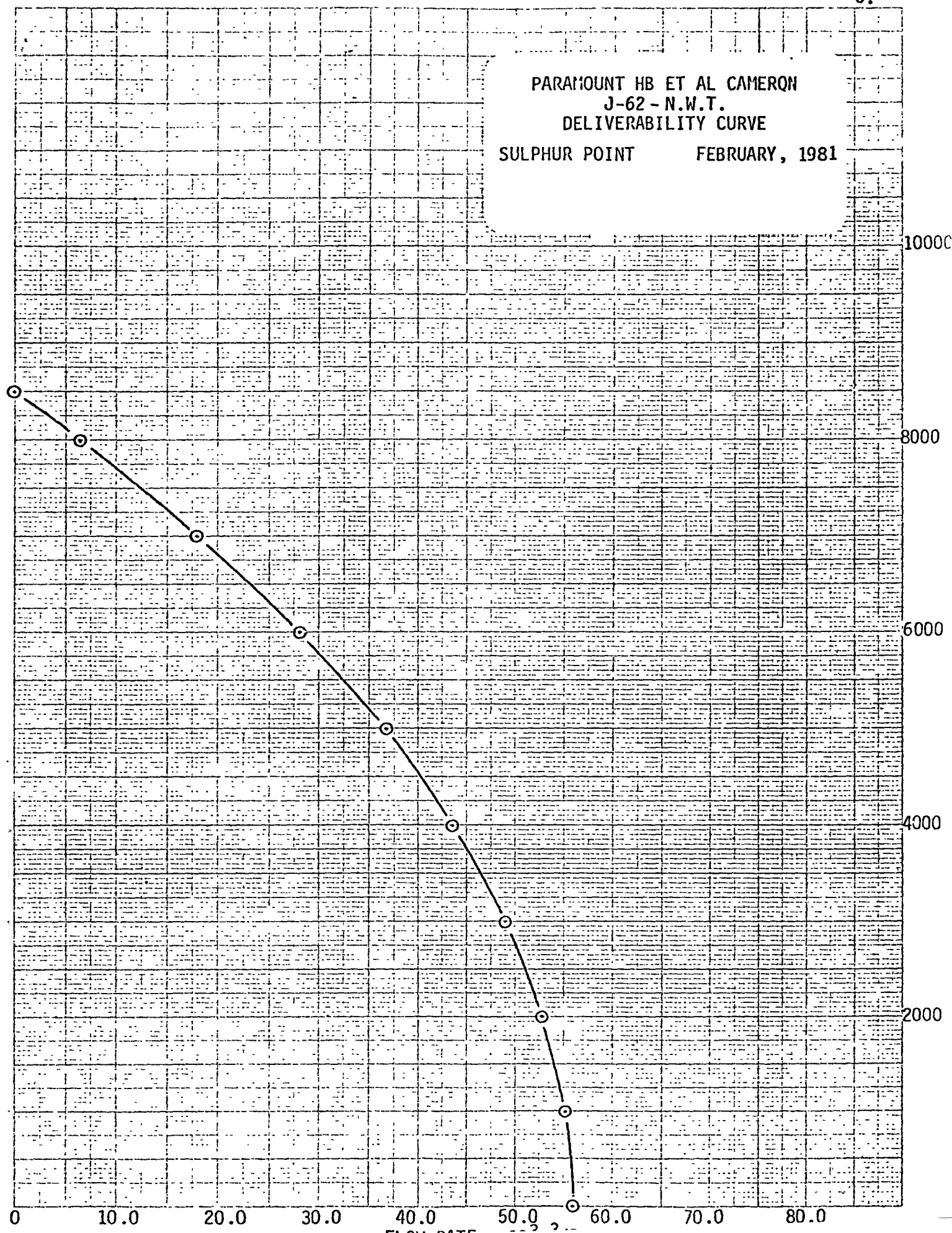
$$n = 1.000$$

$$c = 7.749 \times 10^{-4} \text{ m}^3/\text{D}/\text{kPa}^2$$

P_d Tubing Wellhead Pressure - kPa	Q Flow Rate $10^3 \text{ m}^3/\text{D}$
0.0	56.000
1000.0	55.225
2000.0	52.900
3000.0	49.026
4000.0	43.602
5000.0	36.627
6000.0	28.103
7000.0	18.030
8000.0	6.406
8501.0	0

WHP - kPaa 6.

PARAMOUNT HB ET AL CAMERON
J-62 - N.W.T.
DELIVERABILITY CURVE
SULPHUR POINT FEBRUARY, 1981



PARAMOUNT HB ET AL CAMERON

J-62 - N.W.T.

STABILIZED DELIVERABILITY CURVE DATA

SULPHUR POINT

FEBRUARY, 1982

$$Q = c(P_w^2 - P_d^2)^n$$

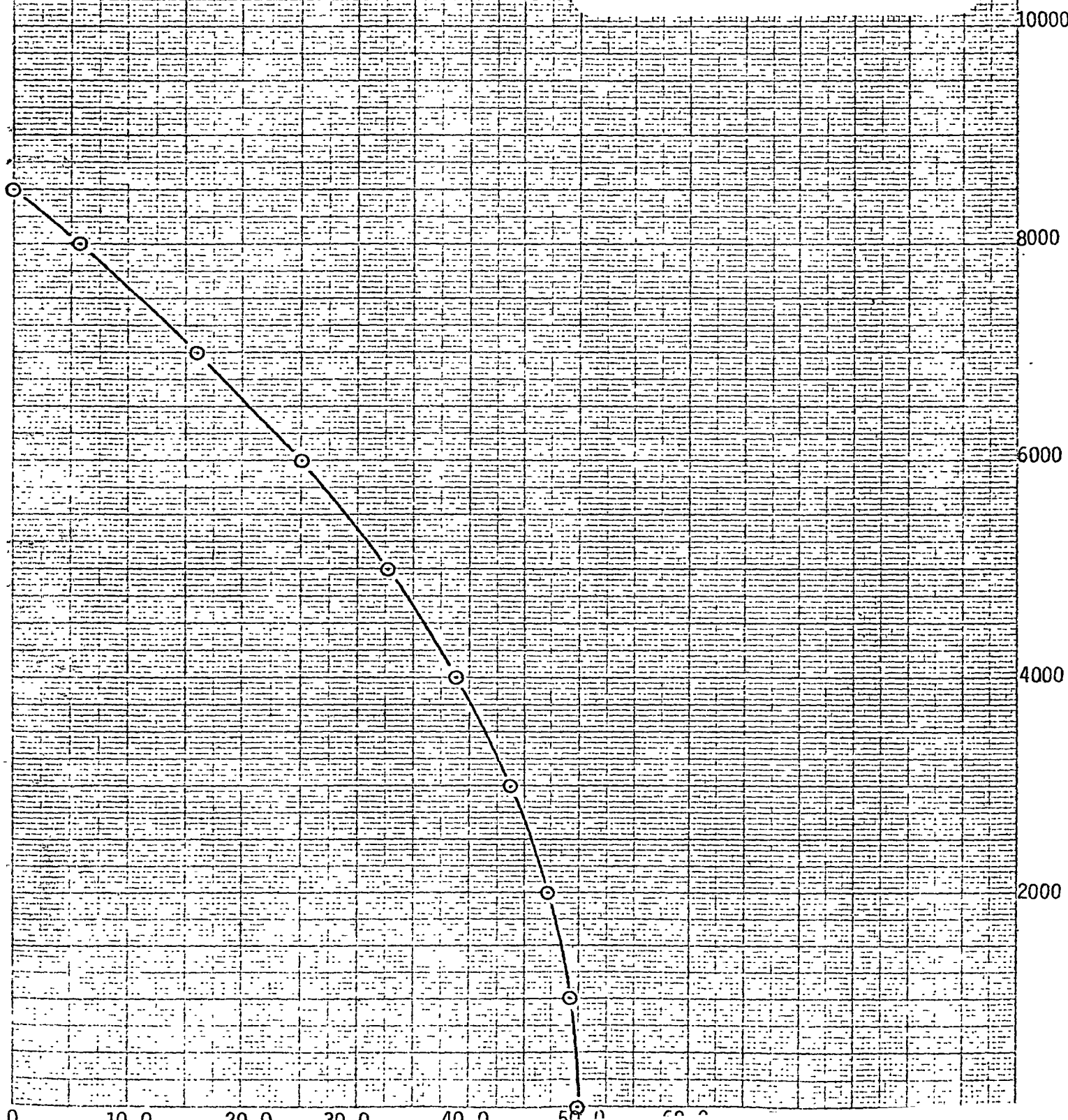
$$n = 1.000$$

$$c = 6.919 \times 10^{-4} \text{ m}^3/\text{D}/\text{kPaa}^2$$

P_d Tubing Wellhead Pressure - kPaa	Q Flow Rate $10^3 \text{ m}^3/\text{D}$
0.0	50.000
1000.0	49.308
2000.0	47.232
3000.0	43.773
4000.0	38.930
5000.0	32.703
6000.0	25.092
7000.0	16.098
8000.0	5.720
8501.0	0

WHP - kPaa 8.

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J-62 - N.W.T.
STABILIZED DELIVERABILITY CURVE
SULPHUR POINT FEBRUARY, 1981



Field Data

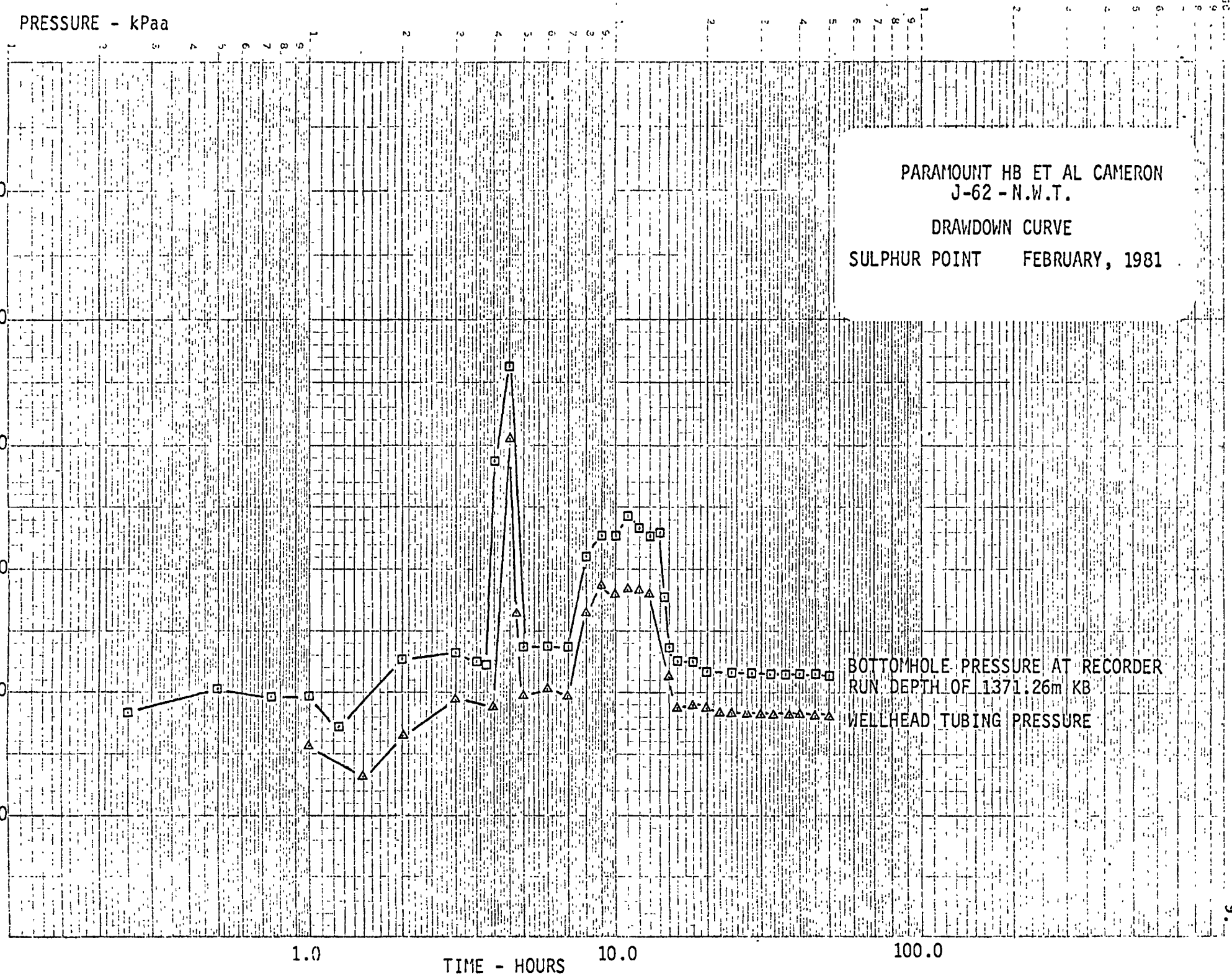
Pressure

Field Analysis

Drift of Analysis

Calculations

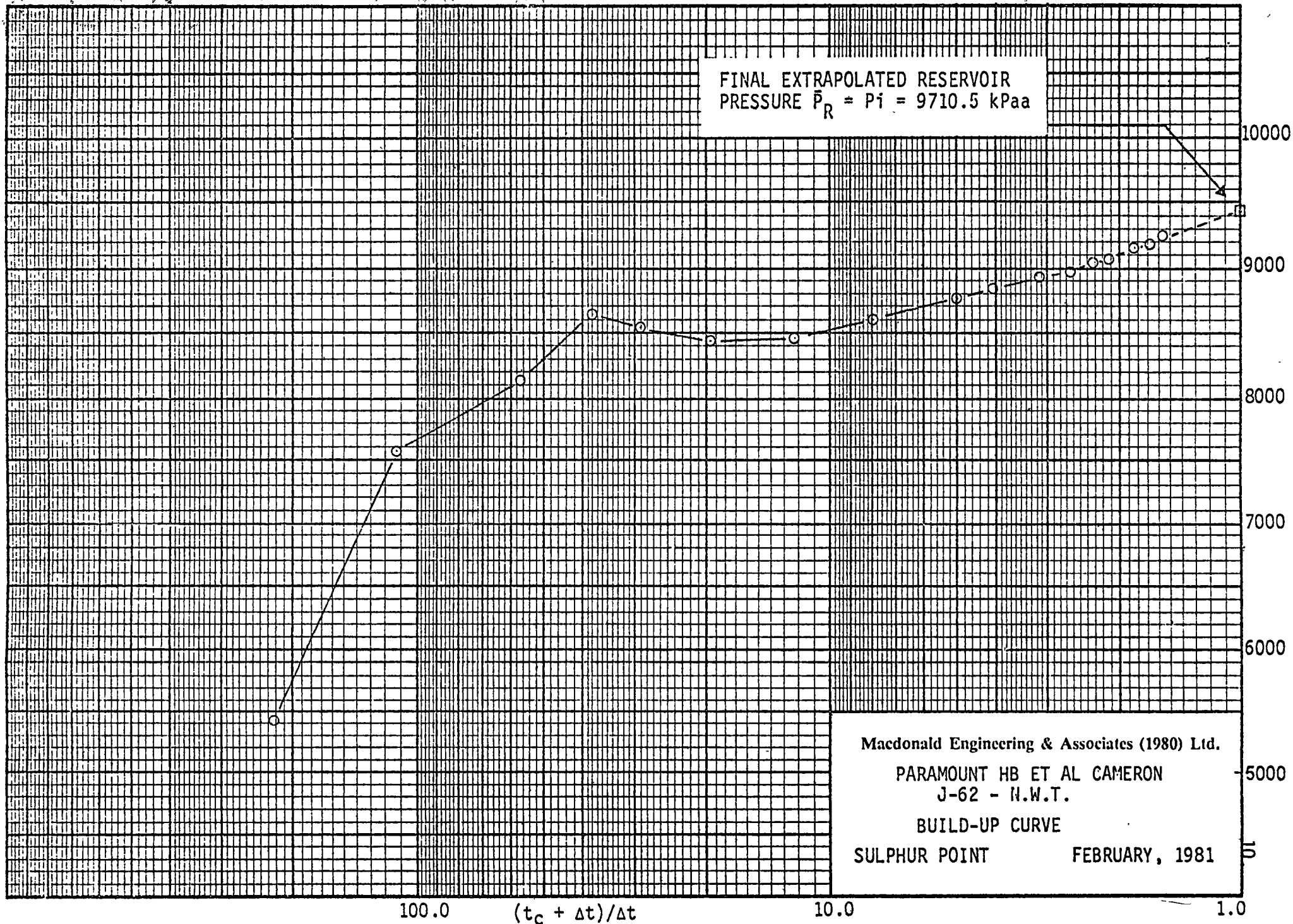
PARAMOUNT HB ET AL CAMERON
J-62 - N.W.T.
DRAWDOWN CURVE
SULPHUR POINT FEBRUARY, 1981



BOTTOMHOLE PRESSURE AT RECORDER
RUN DEPTH OF 1371.26m KB
WELLHEAD TUBING PRESSURE

$P_{ws}^2 \times 10^4 \text{ kPaa}^2$ at MPP of 1386.75m KB

FINAL EXTRAPOLATED RESERVOIR
PRESSURE $\bar{P}_R = P_i = 9710.5 \text{ kPaa}$



PARAMOUNT HB ET AL CAMERON
J-62 - N.W.T.
BUILD-UP DATA
SULPHUR POINT FEBRUARY, 1981

Δt	$\frac{t_c + \Delta t}{\Delta t}$	$P_{ws} - \text{kPaa}$ AT MPP OF 1386.75m KB	$\frac{P_{ws}^2}{10^4 \text{kPaa}^2}$
0.25	222.88	7355.1	5409.7
0.50	111.94	8693.0	7556.8
1.00	56.47	9016.2	8129.2
1.50	37.98	9285.6	8622.2
2.00	28.74	9243.0	8543.3
3.00	19.49	9176.8	8421.4
5.00	12.09	9207.5	8477.8
8.00	7.93	9275.4	8603.3
14.00	4.96	9359.2	8759.5
18.00	4.08	9392.2	8821.3
26.00	3.13	9440.5	8912.3
34.00	2.63	9480.2	8987.4
42.00	2.32	9506.4	9037.2
50.00	2.11	9527.2	9076.8
66.00	1.84	9566.2	9151.2
82.00	1.68	9582.6	9182.6
97.00	1.57	9616.2	9247.1

REMARKS:

CUMULATIVE PRODUCTION: 108860.7 m³LAST RATE: 47103.3 m³/D

$$t_c = \frac{\text{CUM. PROD.} \times 24}{\text{LAST RATE}}$$

$$= \frac{108860.7}{47103.3} \times 24 = 55.47 \text{ HOURS}$$

PARAMOUNT HB ET AL CAMERON
J-62 - N.W.T.
BUILD-UP ANALYSIS
SULPHUR POINT FEBRUARY, 1981

RESULTS

	<u>METRIC(SI) UNITS</u>	<u>FIELD UNITS</u>
1. Average Reservoir Pressure, $\bar{P}_R$	9710.5 kPaa	1408.3 psia
2. Compressibility, $\bar{Z}$ at $\bar{P}$	0.894	0.894
3. Formation Flow Capacity, kh	34.751 mD.m.	114.012 md.ft.
4. Permeability, k	3.407 mD.	3.452 md.
5. Apparent Skin Factor, s' at 47103.3 m ³ /D indicating a damaged formation	+3.018	+3.018
6. Flow Efficiency	70.8%	70.8%
7. Damage Ratio	1.41	1.41
8. Radius of Investigation	133.3 meters	437.3 feet
9. Time to Stabilization		
- 1 Section Drainage	2048.2 hours	2048.2 hours
- 1/4 Section Drainage	510.8 hours	510.8 hours
10. Stabilized Flow against 3596 kPaa Tubing Wellhead Pressure	41985.9 m ³ /D	1.490 MMCF/D

NOTE: The above calculation is a long range theoretical deliverability forecast based on a one section drainage. The estimated time to reach the above theoretical stabilized flow will be approximately 0.23 years.

PARAMOUNT HB ET AL CAMERON

J-62 - N.W.T.

BUILD-UP ANALYSIS

SULPHUR POINT

FEBRUARY, 1981

1. Build-Up Data:

Cumulative Production, G_p	108860.7 m ³
Final Flow Rate, q	47103.3 m ³ /D
Corrected Flow Time, t_c	55.47 hours
Actual Flow Time, t	56.17 hours
Slope, m	$8.45 \times 10^6 \text{ kPa}^2/\text{cycle}$

2. Reservoir Data:

P^* = 9677.3 kPaa	h = 10.2m	$\bar{\mu}$ = 14.22 μ Pa.s
$\bar{P}_R$ = 9710.5 kPaa	ϕ_t = 12.0%	$\bar{Z}$ = 0.894
P_{ws1} = 8888.3 kPaa	s_w = 20.0%	$\bar{c}$ = $1.136 \times 10^{-4} \text{ kPa}^{-1}$
P_{wfo} = 4277.1 kPaa	r_w = 0.070m	T = 328.9 °K
$\bar{P}$ = 9282.8 kPaa		

3. Calculations:

a) Flow Capacity, kh

$$kh = \frac{1.491 q \bar{\mu} \bar{Z} T}{m} = \frac{1.491(47103.3)(14.22)(0.894)(328.9)}{8.45 \times 10^6}$$

$$= 34.751 \text{ mD.m}$$

b) Permeability, k

$$k = \frac{kh}{h} = 3.407 \text{ mD.}$$

c) Apparent Skin Factor, s'

$$s' = 1.151 \left[\frac{P_{ws1}^2 - P_{wfo}^2}{m} - \log \left(\frac{k}{\phi_g \bar{\mu} \bar{c} r_w^2} \right) + 2.09 \right]$$

$$= 1.151 \left[\frac{(8888.3)^2 - (4277.1)^2}{8.45 \times 10^6} - \log \left(\frac{3.407}{(0.096)(14.22)(1.136 \times 10^{-4})(0.0049)} \right) + 2.09 \right]$$

$$= 1.151 (7.184 - 6.652 + 2.09)$$

$$= +3.018, \text{ indicating a damaged formation}$$

d) Flow Efficiency, FE

$$FE = \frac{(\bar{P}_R^2 - P_{wfo}^2) - 0.869 ms'}{\bar{P}_R^2 - P_{wfo}^2}$$

$$= \frac{((9710.5)^2 - (4277.1)^2) - 0.869 (8.45 \times 10^6)(3.018)}{(9710.5)^2 - (4277.1)^2}$$

$$= 0.708$$

e) Damage Ratio, 1/FE

$$1/FE = 1.41$$

f) Radius of Investigation, r_{inv}

$$r_{inv} = \left[\frac{kt}{69.44 \phi_g \bar{\mu} \bar{c}} \right]^{0.5} = \left[\frac{(3.407)(56.17)}{69.44(0.096)(14.22)(1.136 \times 10^{-4})} \right]^{0.5}$$

$$= 133.3 \text{ meters}$$

g) Time to Stabilization

$$i) \text{ 1 Section Drainage } t_s = \frac{69.44 \phi_g \bar{\mu} \bar{c}}{k} (805)^2 = 2048.2 \text{ hours}$$

$$ii) \text{ 1/4 Section Drainage } t_s = \frac{69.44 \phi_g \bar{\mu} \bar{c}}{k} (402)^2 = 510.8 \text{ hours}$$

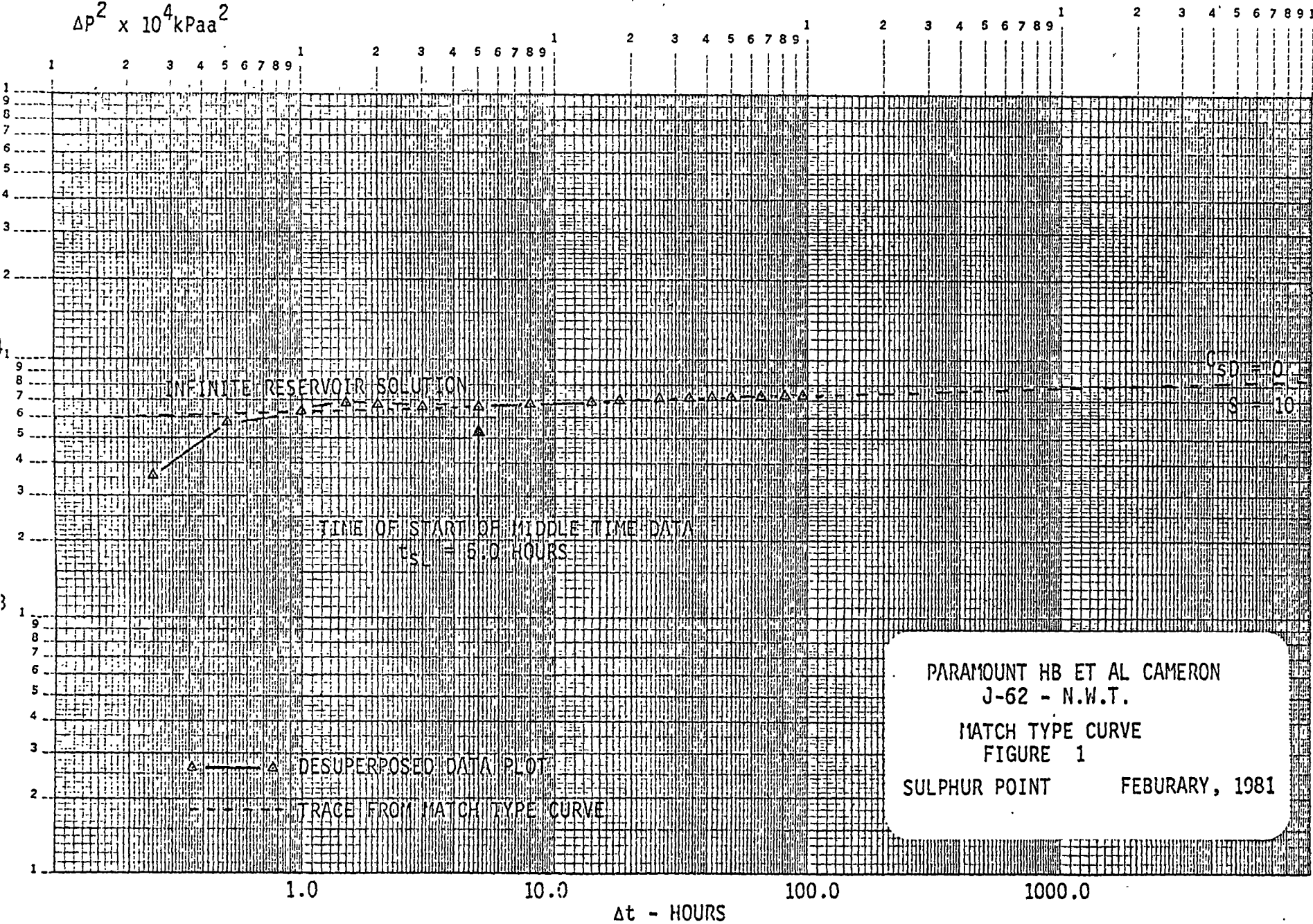
h) Stabilized Flow against 3596 kPaa Tubing Wellhead Pressure.

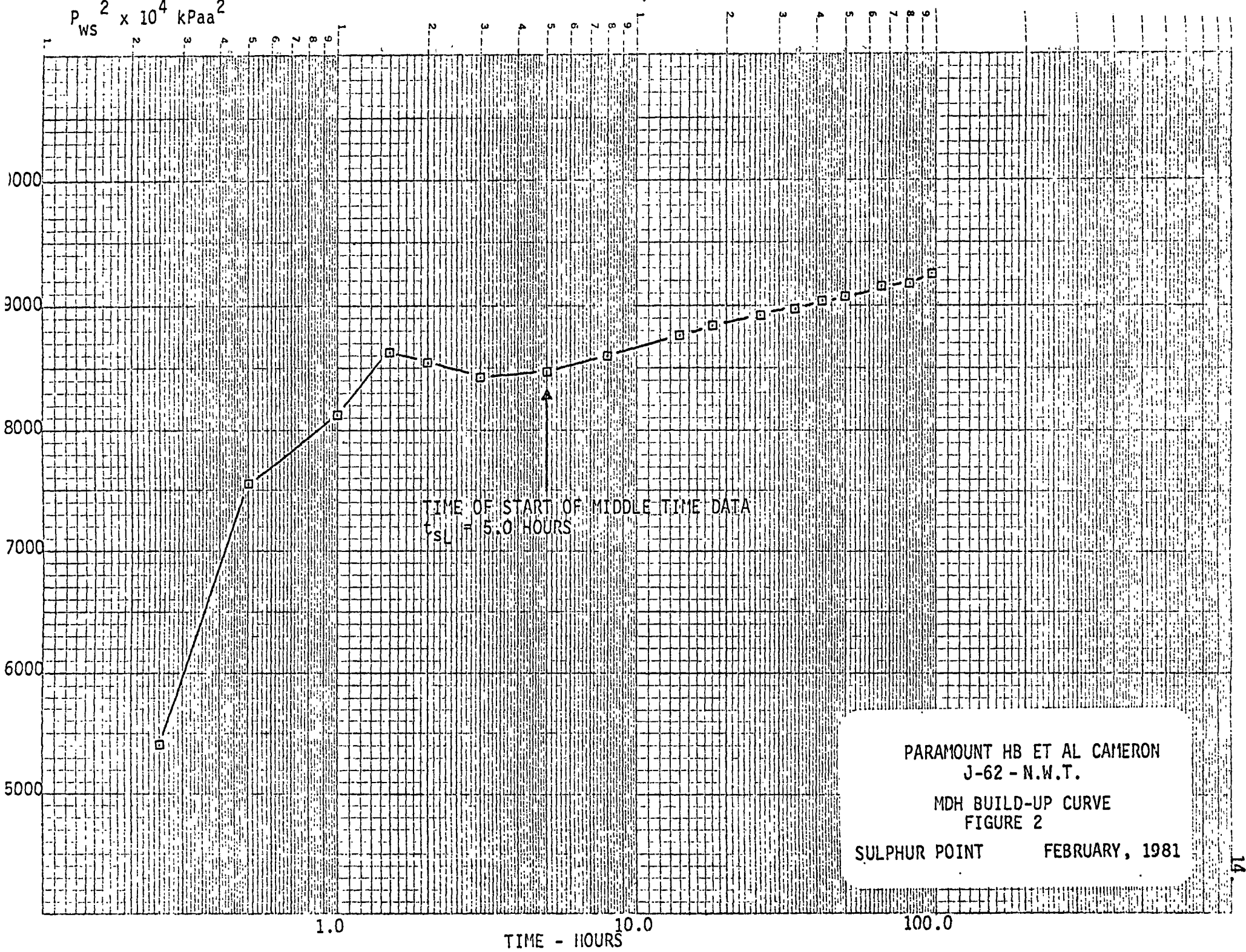
$$q_{st} = \frac{kh (\bar{P}_R^2 - P_{wfo}^2)}{2.982 \bar{\mu} \bar{Z} T \left[\log \left(\frac{0.472 r_e}{r_w} \right) + \frac{s'}{2.303} \right]}$$

$$= \frac{(34.751)((9710.5)^2 - (4277.1)^2)}{2.982(14.22)(0.894)(328.9) \left[\log \left(\frac{0.472(805)}{0.070} \right) + \frac{3.018}{2.303} \right]}$$

$$= 41985.9 \text{ m}^3/\text{D, for 1 section Drainage.}$$

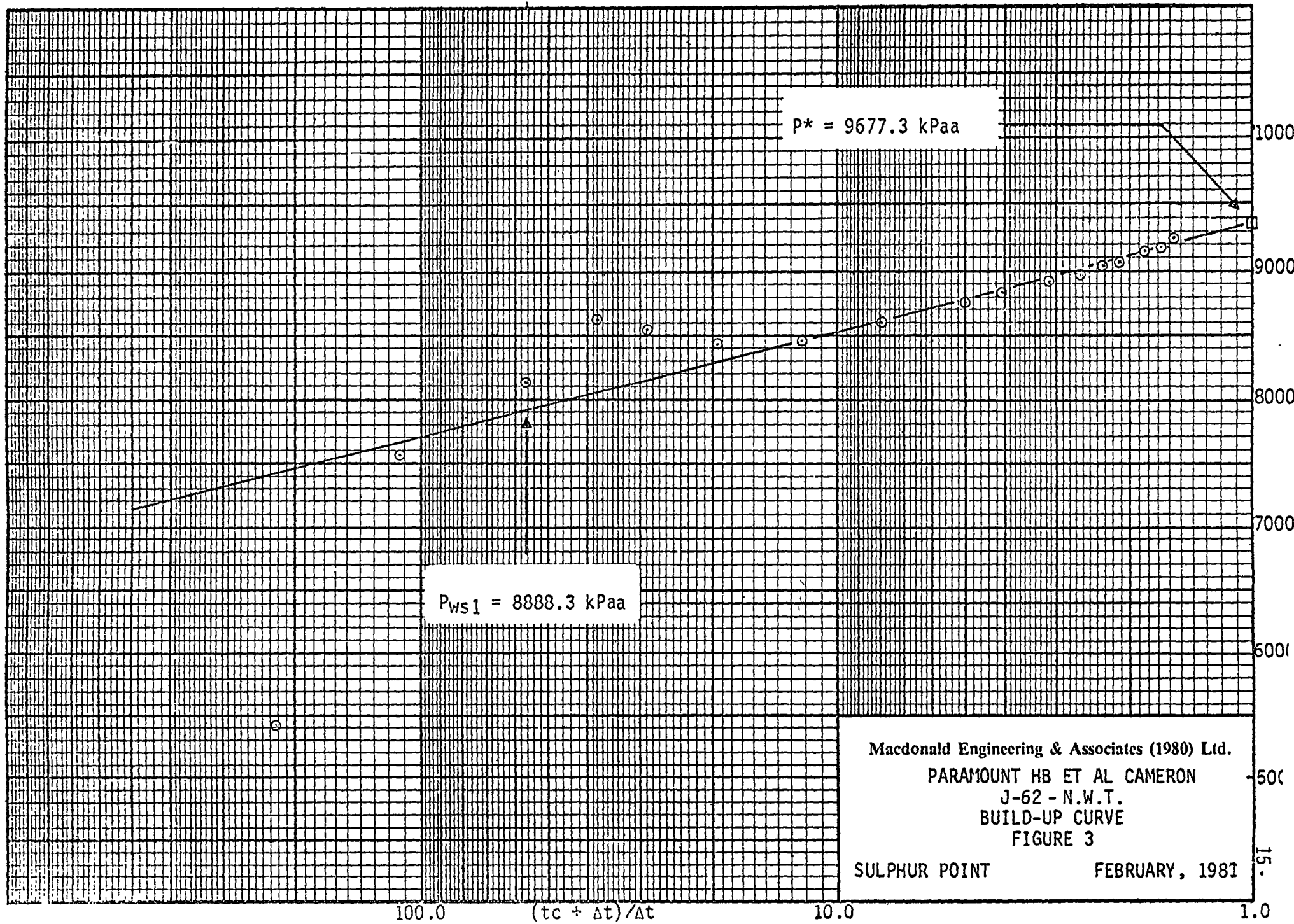
$$\Delta P^2 \times 10^4 \text{ kPa}^2$$





Δt - HOURS
1.0

$P_{ws}^2 \times 10^4 \text{ kPaa}^2$ at MPP of 1386.75m KB



PARAMOUNT HB ET AL CAMERON

J-62 - N.W.T.

BUILD-UP ANALYSIS DATA

SULPHUR POINT FEBRUARY, 1981

Δt	$\frac{t_c + \Delta t}{\Delta t}$	$P_{ws} - \text{kPaa}$ AT MPP OF 1386.75m KB	P_{ws}^2 10^4kPaa^2	$10^4 \Delta P^2$ 10^4kPaa^2
0.25	222.88	7355.1	5409.7	3580.3
0.50	111.94	8693.0	7556.8	5727.4
1.00	56.47	9016.2	8129.2	6299.8
1.50	37.98	9285.6	8622.2	6792.8
2.00	28.74	9243.0	8543.3	6713.9
3.00	19.49	9176.8	8421.4	6592.0
5.00	12.09	9207.5	8477.8	6648.4
8.00	7.93	9275.4	8603.3	6773.9
14.00	4.96	9359.2	8759.5	6930.1
18.00	4.08	9392.2	8821.3	6991.9
26.00	3.13	9440.5	8912.3	7082.9
34.00	2.63	9480.2	8987.4	7158.0
42.00	2.32	9506.4	9037.2	7207.8
50.00	2.11	9527.2	9076.8	7247.4
66.00	1.84	9566.2	9151.2	7321.8
82.00	1.68	9582.6	9182.6	7353.2
97.00	1.57	9616.2	9247.1	7417.7

REMARKS:

CUMULATIVE PRODUCTION: 108860.7 m³LAST RATE: 47103.3 m³/D

$$t_c = \frac{\text{CUM. PROD.} \times 24}{\text{LAST RATE}}$$

$$= \frac{108860.7}{47103.3} \times 24 = 55.47 \text{ HOURS}$$

$$P_{wfo} = 4277.1 \text{ kPaa}$$

$$P_{wfo}^2 = 1829.4 \times 10^4 \text{ kPaa}^2$$

WELL DATA

WELL PARAMOUNT HB ET AL CAMERON FIELD J-62 - N.W.T. CAMERON HILLS
PROVINCE N.W.T. DATE OF TEST FEBRUARY 7-16, 1981
OPERATOR PARAMOUNT RESOURCES LTD. FORMATION SULPHUR POINT
ELEVATIONS: 755.0m K.B. 751.94m C.F. 3.06m C.F. to KB
TUBING: SIZE 73.0mm wt. 9.67 kg/m type J-55 set @ 1381.56m KB
CASING: SIZE 139.7mm wt. 23.1 kg/m type J-55 set @ 1605.0m KB

PERFORATED INTERVAL 1384.5 to 1389.0m KB
_____ to _____
_____ to _____
_____ to _____
_____ to _____

MEAN PERFORATED DEPTH 1386.75m KB

AVERAGE LENGTH OF PRODUCING STRING _____ m

BOTTOMHOLE: PRESSURE 9710.5 kPaa TEMPERATURE 55.6 °C

BAROMETRIC PRESSURE 101.3 kPaa

MEAN SURFACE TEMPERATURE -3.0 °C

PRODUCING THROUGH _____ TUBING

REMARKS: TOTAL DEPTH AT 1605.0m KB

PBTD AT 1481.75m KB

BAKER MODEL FB-1 PERMANENT PRODUCTION PACKER

AT 1375.52m KB. BAKER MODEL L SLIDING SLEEVE AT

1372.19m KB

 *
 * P R O G R A M *
 * G A S F L O W *
 *

PARAMOUNT HB ET AL CAMERON
 J-62-N.W.T.

ORIFICE METER CALCULATIONS

NO.	SIZE MM	ORIFICE DIA MM	TEMPR. DEG. C	STATIC PRESS. KPA	DIFF'L KPA	CORIME C'	FLOW RATE Q E03 M3/D
1	73.530	25.400	42.0	1859.30	16.0	251.72	22.4125
2	73.530	25.400	40.0	1652.30	38.0	252.76	32.6948
3	73.530	34.900	40.0	1963.30	17.0	489.72	46.1850
4	73.530	38.100	33.0	1963.30	16.0	598.93	54.7985
5	73.530	38.100	37.0	1342.30	20.0	592.00	50.0727
6	73.530	38.100	43.0	1135.30	12.0	584.69	35.2293
7	73.530	38.100	40.0	1411.30	17.0	589.09	47.1033

ORIFICE FACTORS

NO.	BASIC FB	SP. GRAV FG	FL TEMPR FTF	REY. NO FR	EXPNSION Y	SUPERCORP FPV	MANOMETR FM
1	204.06	1.2639	0.9572	1.0003	1.0015	1.0159	1.0000
2	204.06	1.2639	0.9602	1.0002	1.0041	1.0145	1.0000
3	395.29	1.2639	0.9602	1.0003	1.0014	1.0172	1.0000
4	477.51	1.2639	0.9711	1.0003	1.0013	1.0186	1.0000
5	477.51	1.2639	0.9648	1.0004	1.0024	1.0121	1.0000
6	477.51	1.2639	0.9556	1.0005	1.0017	1.0096	1.0000
7	477.51	1.2639	0.9602	1.0004	1.0019	1.0123	1.0000

NOTE: ORIFICE FACTORS ARE IN IMPERIAL FORM

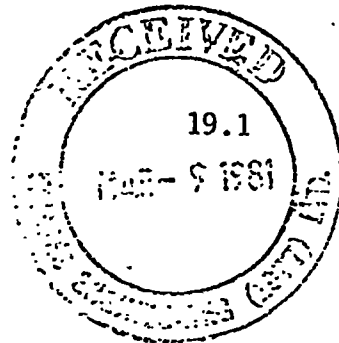
TESTMASTER

TESTMASTER PRODUCTION SERVICES LTD.

1007D - 55th AVENUE N.E.

CALGARY, ALBERTA, CANADA T2E 6W1

PHONE (403) 274-5777



*Paramount Resources Limited
Paramount H.B. et al Cameron
J-62-N.W.T.*

*4 Point Extended Rate
February 7th - 11th, 1981*

Testmaster Production Services Ltd.

TESTMASTER

19.2

TESTMASTER PRODUCTION SERVICES LTD.

1007D - 55th AVENUE N.E.

CALGARY, ALBERTA, CANADA T2E 6W1

PHONE (403) 274-5777

METRIC CONVERSIONS

<u>Field Unit</u>	<u>Multiplication Factor</u>	<u>Units</u>	<u>Symbols</u>
Barrel (35 Imp. Gal.)	.159	Cubic Meter	m ³
Gallon	.004546	Cubic Meter	m ³
MMCF	28262.31	Cubic Meter	m ³
PSI	6.895	Kilopascal	kPa
Differential	.249	Kilopascal	kPa
Inches	25.4	Millimeter	mm
Degree (°F)	(°F-32) x .555	Degrees Celcius	°C

Meter Run Size - Upstream - 73.79 mm.
- Downstream - 73.53 mm.

H.P. Meter Size - 2000 PSI (13790 kPa)
- 0 - 200 Inches (0 - 50 kPa)

OTHER

[illegible]

REMARKS

GAS PRODUCTION (24 hr.)

GAS PRODUCTION CUMULATIVE

LIQUID PRODUCTION (24 hr.)

Condensate/Oil _____ Water

LIQUID PRODUCTION CUMULATIVE

Condensate/Oil ----- Water

LIQUID PROD. BALANCE

OPENING GAUGE

PLUS PRODUCTION

	TOTALS	
--	--------	--

MINUS SHIPPING	
----------------	--

EQUALS CLOSING GAUGE

TANK NO.

End

WAR

TANK NO

Case

1

$$\overline{19.13}$$

CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE _____ L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T.

PIPELINE _____

OTHER _____

DATE Feb. 8/81 TIME	WELLHEAD DATA			Choke Size	H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION				GAS PRODUCED		
	TUBING Pressure	Flow Temp	CASING Pressure		STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP $\frac{64m^3}{cm}$ per $\frac{.104}{m^3}$		CAP _____ per _____			Cumul. Oil, Cond Prod.	Cumul. Water Prod.
					or Prover															
					Recorder	D.W.G.														
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	Fi-Ins	Barrels	Fi-Ins	Barrels	Barrels	Barrels	ft ³ /d
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	C m	m ³	m	m ³	m ³	m ³	m ³ /d
0845	8400				Shut in pressure															
0855					Pressure test flow line															
0900	8400			4.76	Open well on 4.76mm choke through separator															
					on 1st Rate of 4 Point test.															
0905	7500																			
0910	7000																			
0915	6550	-7		4.76	1241		16	44	25.4											19.78x
0930	5510	-5			1654		17	44												23.17x
0945	5750	-3			1654		15	39												22.04x
1000	6000	-1			1758		15	38												22.89x
1030	6220	-2			1758		16	38												22.61x
										End of 1st Rate										
1100	6450	-2			1758		16	42		Shut in for 2 hr. Build-ups										23.03x
1105	6710																			

REMARKS

GAS PRODUCTION (24 hr.)

LIQUID PROD. BALANCE

TANK NO. 1
Cond. Water Cond.

GAS PRODUCTION CUMULATIVE

OPENING GAUGE

LIQUID PRODUCTION (24 hr.)

PLUS PRODUCTION

Condensate/Oil _____ Water _____

TOTALS

LIQUID PRODUCTION CUMULATIVE

MINUS SHIPPING

Condensate/Oil _____ Water _____

EQUALS CLOSING GAUGE

19.4

CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kPa

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE _____ L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T. PIPELINE _____

OTHER _____

DATE Feb. 8/81 TIME	WELLHEAD DATA			Choke Size	H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION						GAS PRODUCT
	TUBING Pressure	Flow Temp	CASING Pressure		STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP <u>64m3</u>		CAP _____		Cumul. Oil, Cond. Prod.	Cumul. Water Prod.	
					or Prover									_____ per _____						
					Recorder	D.W.G.								<u>1</u> cm	<u>.104</u> m3	_____ per _____				
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	Fi-In	Barrels	Fi-In	Barrels	Barrels	Barrels	ft3/d
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	C m	m3	m	m3	m3	m3	m3/d
1110	6980																			
1115	7220																			
1130	8220																			
1145	8265																			
1200	8275																			
1230	8280																			
1300	8285																			
1305	7200	-2		Open well through separator on 7.14mm choke to start Second Rate.																
1310	5700	-2																		
1315	5050	-1		7.14	1655		35	33	25.4											35.89x
1330	4885	0			1655		32	20												31.65x
1345	5000	0			2172		24	42	Back pressure valve malfunctioning											31.09x

REMARKS

GAS PRODUCTION (24 hr.)

GAS PRODUCTION CUMULATIVE

LIQUID PRODUCTION (24 hr.)

Condensate/Oil _____ Water _____

LIQUID PRODUCTION CUMULATIVE

Condensate/Oil _____ Water _____

LIQUID PROD. BALANCE

OPENING GAUGE

PLUS PRODUCTION

TOTALS

MINUS SHIPPING

EQUALS CLOSING GAUGE

TANK NO. 1
Cond. _____ Water _____

TANK NO. 2
Cond. _____ Water _____

19.5

CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kPa

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE _____ L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T.

PIPELINE _____

OTHER _____

DATE Feb. 8/81 TIME	WELLHEAD DATA				H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION								GAS PRODUCT
	TUBING Pressure	Flow Temp	CASING Pressure	Choke Size	STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP <u>64m3</u>		CAP _____		Cumul. Oil, Cond. Prod.	Cumul. Water Prod.			
					or Prover									per	per							
					Recorder	D.W.G.																
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	ft-ins	Barrels	ft-ins	Barrels	Barrels	Barrels			
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	C m	m3	m	m3	m3	m3			
1400	5115	1		7.14	1862		32	40	25.4										33.63x1			
1430	5270	1			1551		36	42											33.07x1			
1500	5145	1			1551		38	40		End of Second Rate									33.91x1			
1505	6030																					
1510	7600																					
1515	7800																					
1530	8090																					
1545	8120																					
1600	8140																					
1630	8190																					
1700	8200				Third Rate on 34.9mm orifice plate Open well through separator on 9.53mm choke																	
1705	4000																					

REMARKS _____	GAS PRODUCTION (24 hr.) _____		LIQUID PROD. BALANCE		TANK NO. 1		TANK NO. 2	
	GAS PRODUCTION CUMULATIVE _____		OPENING GAUGE		Cond	Water	Cond	Water
	LIQUID PRODUCTION (24 hr.) _____		PLUS PRODUCTION					
	Condensate/Oil _____ Water _____		TOTALS				19.6	
	LIQUID PRODUCTION CUMULATIVE _____		MINUS SHIPPING					
	Condensate/Oil _____ Water _____		EQUALS CLOSING GAUGE					

CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kPa

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T. PIPELINE _____

OTHER _____

DATE Feb. 8/81 TIME	WELLHEAD DATA				H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION								GAS PRODUCT
	TUBING Pressure	Flow Temp	CASING Pressure	Choke Size	STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP <u>64m3</u>		CAP _____		Cumul. Oil, Cond Prod.	Cumul. Water Prod.			
					or Prover									per	per							
					Recorder	D.W.G.										<u>1</u> cm	<u>.104</u> m3					
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	ft-lbs	Barrels	ft-lbs	Barrels	Barrels	Barrels	ft3/day		
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	C m	m3	m	m3	m3	m3	m3/day		
1710	3250	1		9.53					34.9													
1715	3175	1			1715		16	41		Methanol pump freezing										42.39x1		
1730	3400	2			1586		17	40												45.22x1		
1745	3450	2			1586		17	38												45.22x1		
1800	3700	2			1551		18	38		Liquid to surface										45.22x1		
1830		2			1862		17	40		Unable to dump water												
1900		2								Dump lines frozen from separator to dump										48.05x1		
										By-pass dump also frozen												
		2			2930		17	40		Meter freezing (Approx. water made 150m3)										59.92x1		
										END of Rate # 3												
										Unable to get tubing pressures, Wellhead frozen from 1800 hrs to 2200 hrs.												
2115		-5			Open well to flow through separator on 12.7mm choke					Flow Rate # 4												
2130		-4			with 38.1mm orifice plate					Pumping methanol										56.52x1		
2200	3050	-2			2275			40														
2230	2525	5						32		Take off for repairs												
										Unable to get meter readings frozen												

REMARKS

Estimated flow rate for 4 Point
24 hr. production 13.65x10³m³

GAS PRODUCTION (24 hr.)

GAS PRODUCTION CUMULATIVE

LIQUID PRODUCTION (24 hr.)

Condensate/Oil _____ Water _____

LIQUID PRODUCTION CUMULATIVE

Condensate/Oil _____ Water _____

LIQUID PROD. BALANCE

OPENING GAUGE

PLUS PRODUCTION

TOTALS

MINUS SHIPPING

EQUALS CLOSING GAUGE

TANK NO. 1
Cond. _____ Water _____

TANK NO. 2
Cond. _____ Water _____

19.7

CUSTOMER Paramount Resources Ltd. TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kPa

WELL Paramount H.B. et al Cameron GAS TO FLARE X CHOKE 25.4mm L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T. PIPELINE _____ OTHER _____

DATE TIME	WELLHEAD DATA				Choke Size	H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION								GAS PRODUCTIO
	TUBING Pressure	Flow Temp	CASING Pressure	STATIC PRESSURE or Prover		Recorder	D.W.G.	Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP <u>64m3</u>		CAP <u> </u>		Cumul. Oil, Cond Prod.	Cumul. Water Prod.			
															<u>1</u> per <u>.104</u>		<u> </u> per <u> </u>						
															cm	m3	ft-ins	Barrels					
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	Fi-ins	Barrels	Fi-ins	Barrels	Barrels	Barrels	ft3/day			
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	C m	m3	m	m3	m3	m3	m3/day			
2300	3200	3		9.53				33	38.1	Cut choke back for				extended rate to 9.53mm				choke					
2330	3770	4						39															
2400	3800	3						40															
February 9th, 1981					Meter replaced and in service.																		
0030	3655	3			2069		13	39															
0100	3690	1			2275		12	41												52.00x10			
0115	7100							41		Safety shut down valve closed.													
0135	7995							42															
0140	7800	-6						43		Back pressure valve stuck open use manual block valve.													
0145	5200	1						42															
0200	3835	2			1241		23	45												54.26x10			
0215	3850	3			1310		20	43															

REMARKS	GAS PRODUCTION (24 hr.)				LIQUID PROD. BALANCE				TANK NO. 1		TANK NO. 2	
	GAS PRODUCTION CUMULATIVE				OPENING GAUGE				Cond	Water	Cond	Water
	LIQUID PRODUCTION (24 hr.)				PLUS PRODUCTION							
	Condensate/Oil _____ Water _____				TOTALS							
	LIQUID PRODUCTION CUMULATIVE				MINUS SHIPPING							
	Condensate/Oil _____ Water _____				EQUALS CLOSING GAUGE							

CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T.

PIPELINE _____

OTHER _____

DATE Feb. 9/81 TIME	WELLHEAD DATA				H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION								G PROD
	TUBING Pressure	Flow Temp	CASING Pressure	Choke Size	STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP <u>64m3</u>		CAP _____		Cumul. Oil, Cond Prod.	Cumul. Water Prod.			
					or Prover									_____ per _____								
					Recorder	D.W.G.								_____ cm	_____ m3	_____ per _____						
IMP. Units	PSIG	oF	PSIG	Inches	PSIG	PSIG	Inches	oF	Inches	PSIG	Inches	oF	Inches	Fi-Ins	Barrels	Fi-Ins	Barrels	Barrels	Barrels	ft3		
SI Units	Pga kPa	oC	Pga kPa	mm	Pga kPa	Pga kPa	kPa	oC	mm	Pga kPa	kPa	oC	mm	C m	m3	m	m3	m3	m3	m3		
0230	3875	1		9.53	1310		20	42	38.1													
0300	3950	3			1310		19	42												50.9		
0330	3930	1			1276		20	41														
0400	3860	2			1241		20	37												50.9		
0430	4235	1			1276		19	37														
0500	5195	-3			1138		14	42		Possible ice plug in flowing tubing										40.9		
0530	5330	-5			1034		14	42														
0600	5630	-8			827		14	42												35.8		
0630	5340	-8			1241		13	42														
0700	5500	-10			1138		12.5	42												38.1		
0730	5535	-10			1103		12	42														
0800	5505	-12			1034		11.5	41		Approx. water made	.075m3									35.3		
REMARKS _____										GAS PRODUCTION (24 hr.) <u>14.93m3</u>				LIQUID PROD. BALANCE				TANK NO. _____		TANK _____		
_____										GAS PRODUCTION CUMULATIVE _____				OPENING GAUGE				Cond. _____		Water _____		
_____										LIQUID PRODUCTION (24 hr.) _____				PLUS PRODUCTION								
_____										Condensate/Oil _____ Water _____				TOTALS								
_____										LIQUID PRODUCTION CUMULATIVE _____				MINUS SHIPPING								
_____										Condensate/Oil _____ Water _____				EQUALS CLOSING GAUGE								

CUSTOMER Paramount Resources Ltd. TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 k

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE DIFF. RANGE

LOCATION J-62-N.W.T.

PIPELINE

OTHER

DATE Feb. 9/81 TIME	WELLHEAD DATA			Choke Size	H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION				GAS PRODUCED			
	TUBING Pressure	Flow Temp	CASING Pressure		STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP <u>64m3</u>		CAP _____			Cumul. Oil, Cond Prod.	Cumul. Water Prod.	
					or Prover									1 cm	per .104 m3		per _____				
					Recorder	D.W.G.															
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	ft-lbs	Barrels	ft-lbs	Barrels	Barrels	Barrels	m3/d	
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	C m	m3	m	m3	m3	m3	m3/d	
0830	5585	-11		9.53	896		11	43	38.1												
0900	5550	-13			862		11.5	43												32.50x	
0930	5500	-12			965		12	43													
1000	5500	-12			1103		12	43												37.87x	
1030	5450	-10			1034		12	43													
1100	5450	-10			1034		12	43												36.74x	
1130	5530	-9			965		12	43						Ice plug in flow line let go.							
1200	4120	+4			1172		20	35						Liquid to surface						49.46x	
1230	3715	+3			1172		18	42													
1300	3680	+3			1241		20	44												50.87x	
1330	3680	+3			1207		21	44		750 ppm	H2S										
1400	3675	3			1207		21	44												52.28x	

REMARKS

GAS PRODUCTION (24 hr.)

GAS PRODUCTION CUMULATIVE

LIQUID PRODUCTION (24 hr.)

Condensate/Oil Water

LIQUID PRODUCTION CUMULATIVE

Condensate/Oil Water

LIQUID PROD. BALANCE

OPENING GAUGE

PLUS PRODUCTION

TOTALS

MINUS SHIPPING

EQUALS CLOSING GAUGE

TANK NO. 1

Cond.

Water

Cond.

TANK

Cond.

19.10

CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kPa

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T.

PIPELINE _____

OTHER

[illegible]

REMARKS

GAS PRODUCTION (24 hr.)

GAS PRODUCTION CUMULATIVE

LIQUID PRODUCTION (24 hr.)

Condensate/Oil _____ Water _____

LIQUID PRODUCTION CUMULATIVE

Condensate/Oil _____ Water _____

LIQUID PROD. BALANCE

OPENING GAUGE

PLUS PRODUCTION

	TOTALS	
--	--------	--

MINUS SHIPPING

	EQUALS CLOSING GAUGE
--	----------------------

TANK NO. 1	
Cond.	Wals

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TANK NO.	
Code	

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19		
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CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kPa

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T. PIPELINE _____

OTHER _____

DATE Feb. 9/81 TIME	WELLHEAD DATA			Choke Size	H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION						GAS PRODUCTI
	TUBING Pressure	Flow Temp	CASING Pressure		STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP <u>64m3</u>		Cumul. Oil, Cond Prod.	Cumul. Water Prod.			
					or Prover									CAP <u>1</u> cm	per <u>.104</u> m3					
					Recorder	D.W.G.												per		
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	Ft-lbs	Barrels	Ft-lbs	Barrels	Barrels	Barrels	ft3/day
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	C m	m3	m	m3	m3	m3	m3/day
2030	3575	9		9.53	1138		20	42	38.1											
2100	3580	9			1172		20	43												49.46x10
2130	3580	9			1172		20	43												
2200	3580	9			1241		19	43												49.46x10
2230	3570	9			1241		19	42												
2300	3565	9			1172		20	42												48.33x10
2330	3565	8			1172		19	42												
2400	3565	9			1207		19	43												48.89x10
February 10th, 1981																				
0030	3565	9			1207		19	43												
0100	3565	9			1207		19	43												48.33x10
0130	3565	10			1207		19	43												

REMARKS _____

GAS PRODUCTION (24 hr.) _____

LIQUID PROD. BALANCE

TANK NO. 1
Cond. Water

TANK NO. _____
Cond. Water

GAS PRODUCTION CUMULATIVE _____

OPENING GAUGE

LIQUID PRODUCTION (24 hr.) _____

PLUS PRODUCTION

Condensate/Oil _____ Water _____

TOTALS

LIQUID PRODUCTION CUMULATIVE _____

MINUS SHIPPING

Condensate/Oil _____ Water _____

EQUALS CLOSING GAUGE

19 12

CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kPa

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T. PIPELINE _____

OTHER _____

DATE Feb. 10/81 TIME	WELLHEAD DATA			Choke Size	H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION						GAS PRODUCT
	TUBING Pressure	Flow Temp	CASING Pressure		STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP <u>64m3</u>		Cumul. Oil, Cond Prod.	Cumul. Water Prod.			
					or Prover									CAP <u>1</u> cm per <u>.104</u> m3	CAP _____ per _____					
					Recorder	D.W.G.														
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	Ft-In	Barrels	Ft-In	Barrels	Barrels	Barrels	ft3/day
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	C m	m3	m	m3	m3	m3	m3/day
0200	3560	9		9.53	1207		19	43	38.1											48.05x1
0230	3560	9			1241		18	44												
0300	3560	10			1241		18	44												48.05x1
0330	3555	10			1276		18	44												
0400	3550	9			1310		18	44												48.61x1
0430	3550	9			1276		18	44												
0500	3550	9			1241		18	44												48.05x1
0530	3550	9			1241		18	43												
0600	3550	9			1379		17	44												48.61x1
0630	3545	10			1276		18	45												
0700	3545	9			1310		18	44												48.61x1
0730	3545	9			1310		18	43												

REMARKS

GAS PRODUCTION (24 hr.)

LIQUID PROD. BALANCE

GAS PRODUCTION CUMULATIVE

OPENING GAUGE

LIQUID PRODUCTION (24 hr.)

PLUS PRODUCTION

Condensate/Oil _____ Water _____

TOTALS

LIQUID PRODUCTION CUMULATIVE

MINUS SHIPPING

Condensate/Oil _____ Water _____

EQUALS CLOSING GAUGE

19.13

CUSTOMER Paramount Resources Ltd. TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kP

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T. PIPELINE

OTHER _____

[illegible]

REMARKS

GAS PRODUCTION (24 hr.) 47.60x10³m³

GAS PRODUCTION CUMULATIVE 62.53x10³

LIQUID PRODUCTION (24 hr.)

Condensate/Oil _____ Water

LIQUID PRODUCTION CUMULATIVE

Condensate (Oil) ----- Water

LIQUID PROD. BALANCE

OPENING GAUGE

PLUS PRODUCTION

	TOTALS	
--	--------	--

MINUS SHIPPING	
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EQUALS CLOSING GAUGE

TANK NO. 1		TANK NO. 2	
Cond.	Water	Cond.	Water

Chad	France	Canada

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	19
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CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kPa

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE DIFF. RANGE

LOCATION J-62-N.W.T. PIPELINE

OTHER

DATE Feb. 10/81 TIME	WELLHEAD DATA			Choke Size	H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION				GAS PRODUCT		
	TUBING Pressure	Flow Temp	CASING Pressure		STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP <u>64m3</u>		CAP _____			Cumul. Oil, Cond Prod.	Cumul. Water Prod.
					or Prover									1 per <u>104</u>	_____ per _____					
					Recorder	D.W.G.										cm	m3			
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	Ft-In	Barrels	Ft-In	Barrels	Barrels	Barrels	ft3/day
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	C m	m3	m	m3	m3	m3	m3/day
0830	3545	10		9.53	1345		17	44	38.1											
0900	3535	10			1345		17	44												48.61x1
0930	3535	10			1310		18	43												
1000	3545	10			1358		18	43												49.46x1
1030	3545	10			1358		17	43												
1100	3545	10			1345		18	43												49.46x1
1130	3545	10			1310		18	43												
1200	3545	10			1345		18	44												49.46x1
1230	3545	10			1345		18	44												
1300	3545	10			1358		18	44												49.46x1
1330	3560	10			1379		17	44												
1400	3555	10			1448		17	44												50.87x1

REMARKS	GAS PRODUCTION (24 hr.)				LIQUID PROD. BALANCE				TANK NO. 1		TANK NO. 2	
	GAS PRODUCTION CUMULATIVE				OPENING GAUGE				Cond.	Water	Cond.	Water
	LIQUID PRODUCTION (24 hr.)				PLUS PRODUCTION							
	Condensate/Oil <u> </u> Water <u> </u>				TOTALS							
	LIQUID PRODUCTION CUMULATIVE				MINUS SHIPPING							
	Condensate/Oil <u> </u> Water <u> </u>				EQUALS CLOSING GAUGE							

CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 k

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T.

PIPELINE _____

OTHER _____

DATE Feb. 10/81 TIME	WELLHEAD DATA				H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION								GAS PRODUC
	TUBING Pressure	Flow Temp	CASING Pressure	Choke Size	STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP <u>64m3</u>		CAP _____		Cumul.	Cumul.	PRODUC		
					or Prover									Ft-Ins	Barrels	Ft-Ins	Barrels	Barrels	Barrels			
					Recorder	D.W.G.																
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	Ft-Ins	Barrels	Ft-Ins	Barrels	Barrels	Barrels	ft3/d		
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	C m	m3	m	m3	m3	m3	m3/d		
1430	3565	10		4.33 25.4	1448		17	47	38.1													
1500	3520	10			1448		17	46												50.87x1		
1530	3490	10			1276		18	45		Salinity	26,800 ppm											
1600	3475	10			1241		19	43		0.68% H2S				ON SITE ANALYSIS						49.46x1		
1630	3480	10			1379		16	41		Reset back pressure												
1700	3575	10			1379		17	43		Sample from separator trace of	Condensate									49.46x1		
1730	3545	10			1379		17	44														
1800	3510	10			1345		17	43												48.33x1		
1830	3470	10			1345		17	42														
1900	3470	10			1310		17	41												48.05x1		
1930	3470	10			1310		17	42														
2000	3475	10			1310		17	42														

REMARKS

GAS PRODUCTION (24 hr.)

GAS PRODUCTION CUMULATIVE

LIQUID PRODUCTION (24 hr.)

Condensate/Oil _____ Water _____

LIQUID PRODUCTION CUMULATIVE

Condensate/Oil _____ Water _____

LIQUID PROD. BALANCE

OPENING GAUGE

PLUS PRODUCTION

TOTALS

MINUS SHIPPING

EQUALS CLOSING GAUGE

TANK NO. 1

Cond

Water

TANK NO. 2

Cond

Water

19.16

CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kPa

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T.

PIPELINE _____

OTHER _____

DATE Feb. 10/81 TIME	WELLHEAD DATA			Choke Size	H.P. SEP. GAS METERING					COND or L.P. SEP GAS METERING				LIQUID PRODUCTION				GAS PRODUCT		
	TUBING Pressure	Flow Temp	CASING Pressure		STATIC PRESSURE		Diff.	Temp	Orifice Plate Size	Static Pressure	Diff.	Temp	Orifice Plate Size	CAP _____		CAP _____			Cumul. Oil, Cond Prod.	Cumul. Water Prod.
					or Prover									_____ per _____	_____ per _____					
					Recorder	D.W.G.														
IMP. Units	PSIG	°F	PSIG	Inches	PSIG	PSIG	Inches	°F	Inches	PSIG	Inches	°F	Inches	Ft-lbs	Barrels	Ft-lbs	Barrels	Barrels	Barrels	ft³/d
SI Units	Pga kPa	°C	Pga kPa	mm	Pga kPa	Pga kPa	kPa	°C	mm	Pga kPa	kPa	°C	mm	m	m³	m	m³	m³	m³	m³/d
2030	3495	10		25.4	1310		17	40	38.1											
2100	3500	10			1310		17	41												48.6x1
2130	3495	10			1310		17	40												
2200	3495	10			1310		17	39												48.6x1
2230	3495	10			1310		17	39												
2300	3495	10			1310		17	40												48.6x1
2310	3495	10			1310		17	40		Shut well in			Take samples	Two H.P.	Gas	866,1071				48.6x1
2315	4950																			
2320	6570																			
2325	7370																			
2330	7630																			
2345	7910																			

REMARKS

GAS PRODUCTION (24 hr.)

GAS PRODUCTION CUMULATIVE

LIQUID PRODUCTION (24 hr.)

Condensate/Oil _____ Water _____

LIQUID PRODUCTION CUMULATIVE

Condensate/Oil _____ Water _____

LIQUID PROD. BALANCE

OPENING GAUGE

PLUS PRODUCTION

TOTALS

MINUS SHIPPING

EQUALS CLOSING GAUGE

TANK NO. 1

Cond. Water

Cond. Water

Cond. Water

Cond. Water

Cond. Water

917

CUSTOMER Paramount Resources Ltd.

TEST OPERATOR S. Barkhouse & B. McConnell

REP. BY M. Maddocks

NO. 1 HEATER .75m BTU H.P. METER SIZE 73.53^{mm} DIFF. RANGE 0-50 kPa

WELL Paramount H.B. et al Cameron GAS TO FLARE X

CHOKE 25.4mm L.P. METER SIZE _____ DIFF. RANGE _____

LOCATION J-62-N.W.T.

PIPELINE _____

OTHER _____

[illegible]

REMARKS

GAS PRODUCTION (24 hr.) $28.72 \times 10^3 \text{ cm}^3$

LIQUID PROD. BALANCE

TANK NO. _____
Cond. _____ Wa _____

TANK NO	
CONV	

GAS PRODUCTION CUMULATIVE 91.25×10^3

OPENING GAUGE

LIQUID PRODUCTION (24 hr.)

PLUS PRODUCTION

Condensate/Oil _____ Water

[illegible]

LIQUID PRODUCTION CUMULATIVE

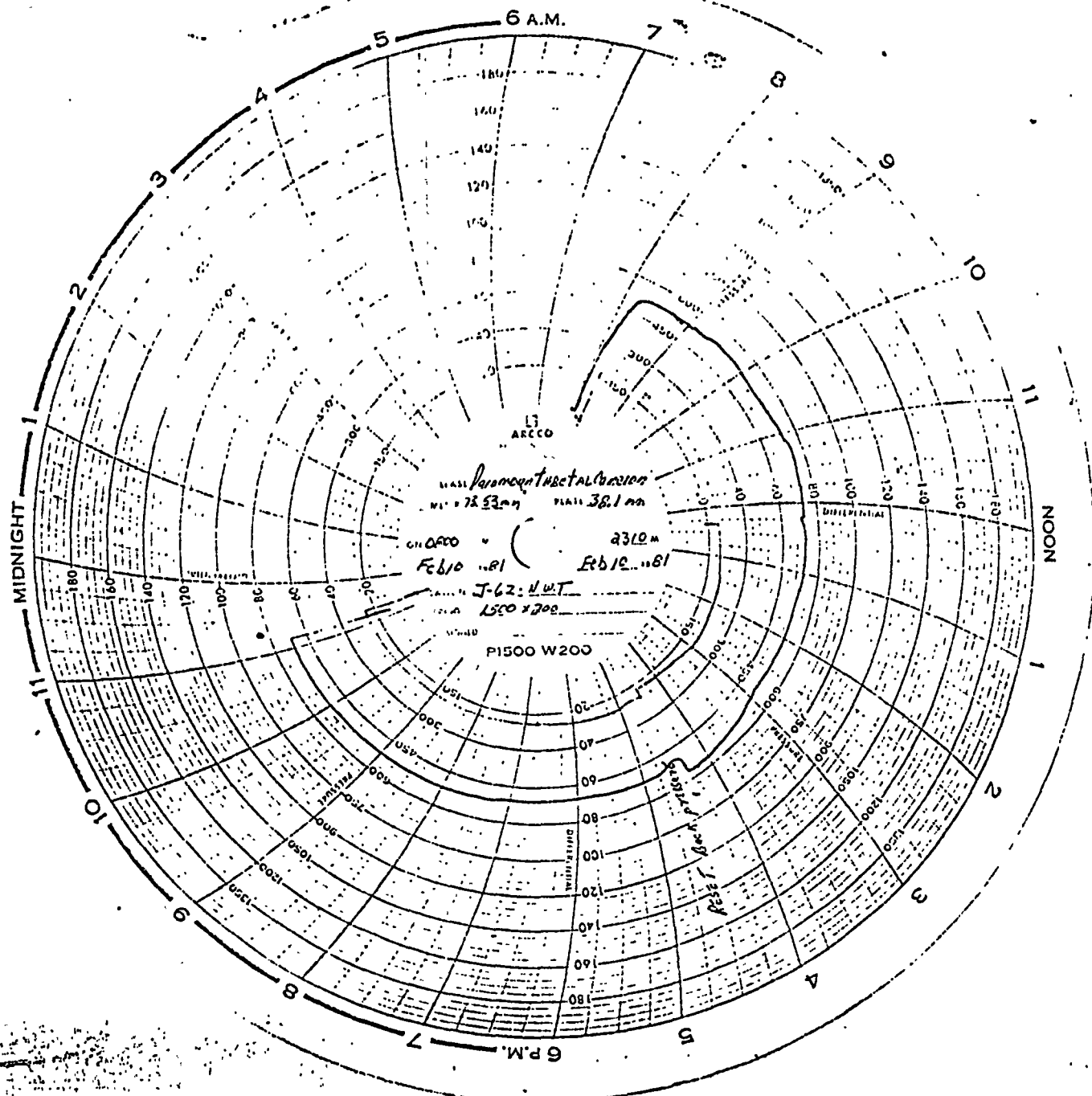
MINUS SHIPPING	
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Condensate/Oil ----- Water

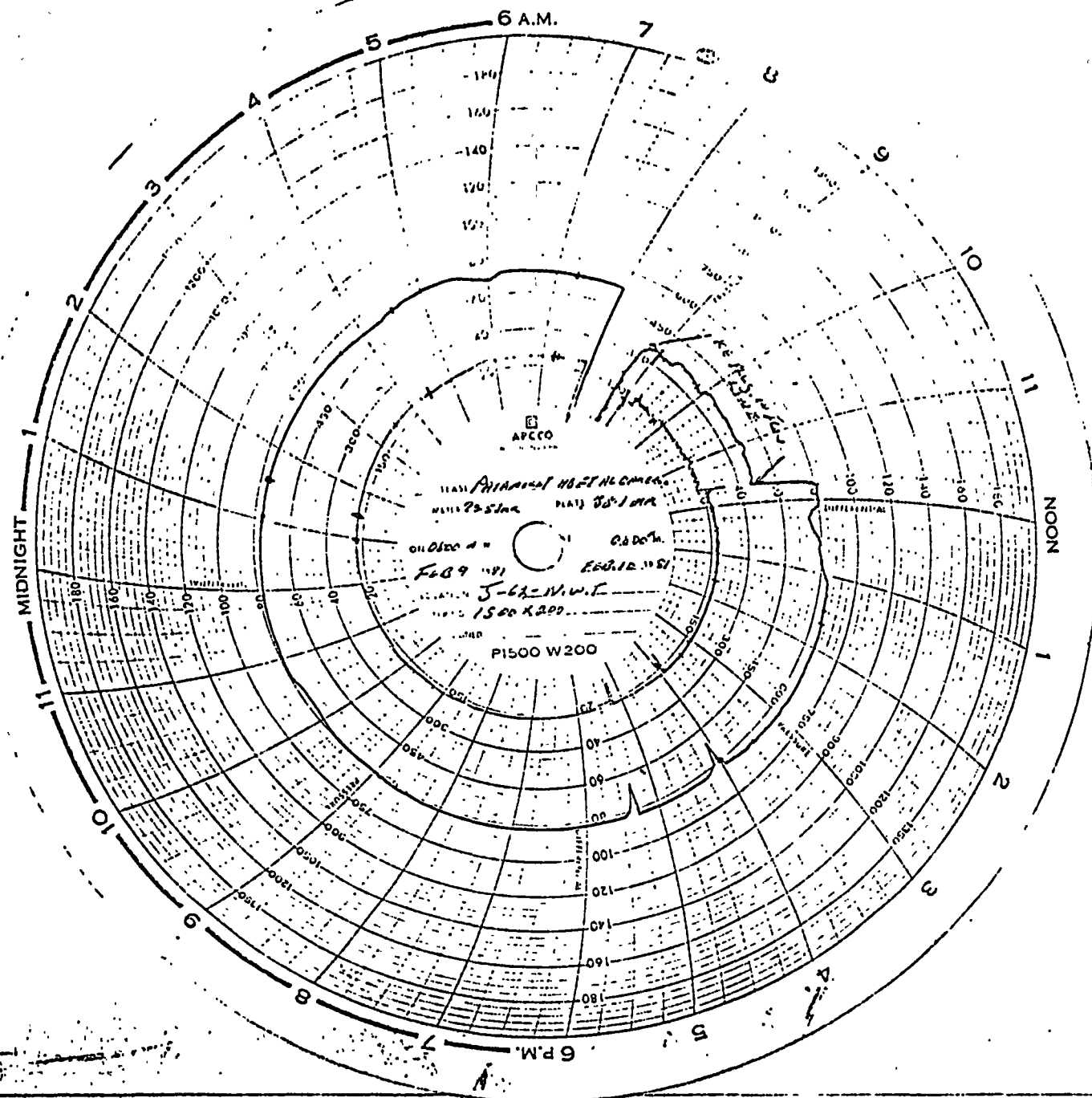
1 EQUALS_CLOSING_GAUGE

19.13

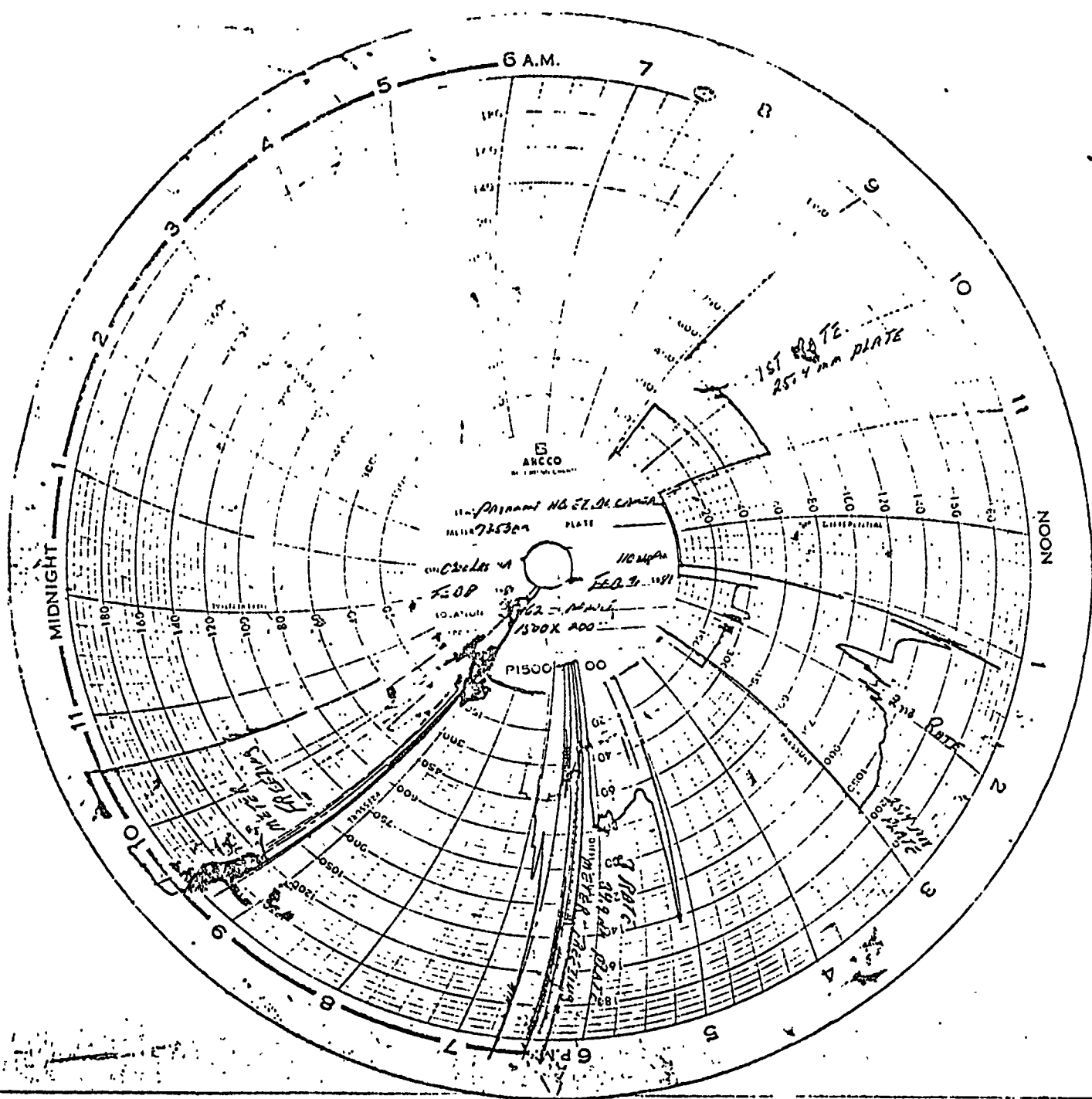
19.19



19.20



[illegible]





20.1

PARAMOUNT RESOURCES LTD.

PARAMOUNT H.B.

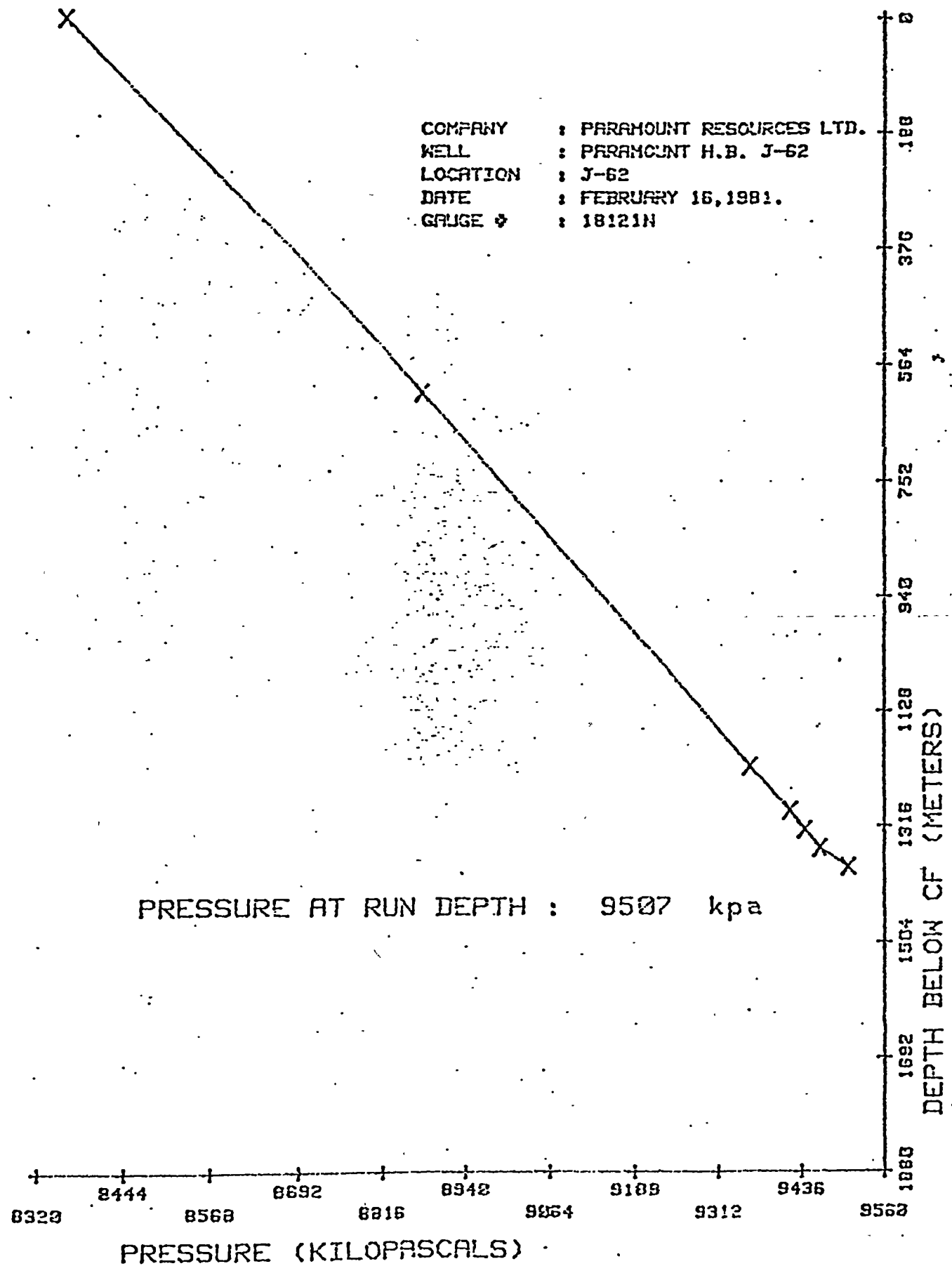
J-62

February 7-16, 1981

ALMECH SUB-SURFACE TOOLS LTD.

20.10

COMPANY : PARAMOUNT RESOURCES LTD.
WELL : PARAMOUNT H.B. J-62
LOCATION : J-62
DATE : FEBRUARY 16, 1981.
GAUGE : 18121N



SUBSURFACE PRESSURE MEASUREMENTS

20.2

COMPANY : PARAMOUNT RESOURCES LTD.
 ADDRESS : CALGARY, ALBERTA.
 FIELD & POOL : SULFER POINT
 TYPE OF TEST : GRADIENT
 PROD. INT CF : 1381.4 to 1385.9
 ELEV. (CF) : 751.9 (KB) : 755
 TOOL DATUM :

WELL NAME : PARAMOUNT H.B. J-62
 LOCATION : J-62
 STATUS : GAS
 DATE OF TEST : FEBRUARY 7, 1981.
 PROD. THROUGH : TUBING
 MID-POINT OF PROD. INT. CF : 1383.65
 DATUM DEPTH OF WELL CF : 0.00

STATIC TEST

TUBING PRES : 8384 KPAG
 CASING PRES : N/A
 RUN DEPTH TOP CF : 1381.7
 TEMPERATURE AT RUN DEPTH : 59.6 C
 GRAD. AT RUN DEPTH TOP : 2.980
 PRES. AT RUN DEPTH TOP : 9603.3

SHUT-IN TIME : N/A *2015 hrs Feb 7/81*
 ON BOTTOM/OFF BOTTOM : 12:01 - 12:06
 SURFACE TEMPERATURE :
 PRES. AT MID-POINT OF PERF. : 9609.2
 DATUM DEPTH PRESS. : 0.0

NOTE : All above units in metric (Depth in metres cf; Pressure in KPAG)

ELEMENT SERIAL NO. : 18121N
 RANGE : 0 - 16200

CLOCK RANGE : 3 HOURS

AL. EQUATION : $320.81 * Defl. + 10.17$ LATEST CALIBRATION : 19/11/80

TOP RECORDER DEPTH (m-cf)	DEFLECTION MM	CALCULATED PRESSURE KPAG	CORRECTION P + PC KPAG	CORRECTED PRESSURE KPAG	GRADIENT KPAG/M
-1.8	26.085	8378.4	1.0	8379.4	0.000
607.8	27.765	8917.4	-.4	8917.0	.082
1217.4	29.272	9400.8	-1.6	9399.2	.791
1290.2	29.466	9463.1	-1.8	9461.3	.853
1320.7	29.552	9490.7	-1.9	9488.8	.902
1351.2	29.626	9514.4	-1.9	9512.5	.776
1381.7	29.910	9605.5	-2.2	9603.3	2.980

REMARKS :

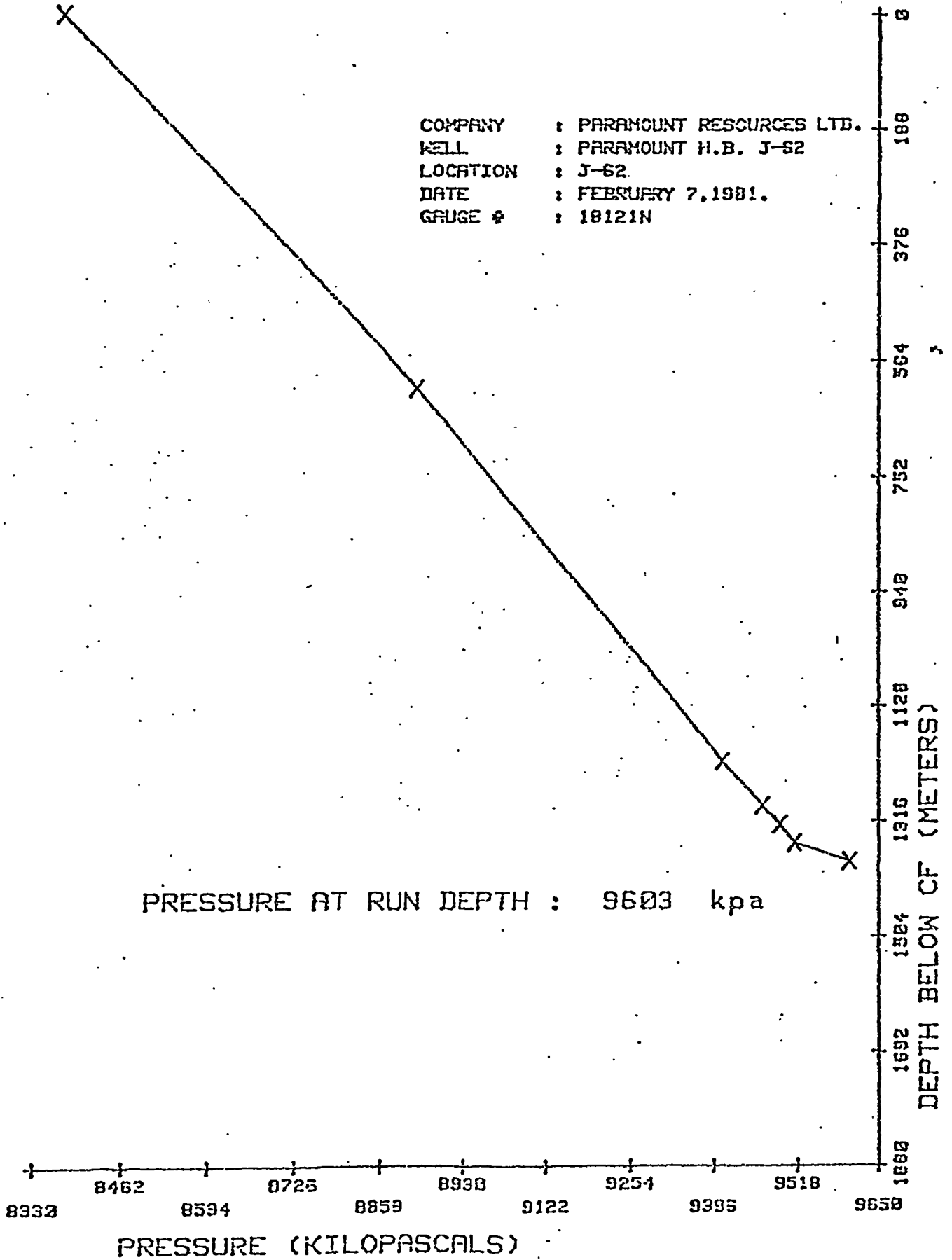
NO TOP CHART DUE TO CLOCK FAILURE.

SURVEY COMPANY : ALMECH SUBSURFACE TOOLS (1976) LTD. TEST BY : D.B.

INTERPRETATION BY : E. S. KYLE INSTRUMENT LTD.

20.3

COMPANY : PARAMOUNT RESOURCES LTD.
 WELL : PARAMOUNT H.B. J-62
 LOCATION : J-62.
 DATE : FEBRUARY 7, 1981.
 GAUGE # : 18121N



SUBSURFACE PRESSURE MEASUREMENTS

20.4

COMPANY : PARAMOUNT RESOURCES LTD. WELL NAME : PARAMOUNT H.B. J-62
 ADDRESS : CALGARY, ALBERTA. LOCATION : J-62
 FIELD & POOL : SULFER POINT STATUS : GAS
 TYPE OF TEST : FOUR POINT DATE OF TEST : FEBRUARY 7 - 16, 1981
 PROD. INT CF : 1381.4 to 1385.9 PROD. THROUGH : TUBING
 FLEV. (CF) : 751.9 (KB) : 755 MID-POINT OF PROD. INT. CF : 1383.65
 POOL DATUM : DATUM DEPTH OF WELL CF : 0.00

STATIC TEST

TUBING PRES : 8384 KPAG SHUT-IN TIME : FEB. 10 2310h. 1981
 CASING PRES : 0 KPAG ON/OFF BOT. : 7/2-1342h - 16/2-1105h
 RUN DEPTH CF : 1368.2 SURFACE TEMP. :
 TEMPERATURE AT RUN DEPTH : 55.6 C PRES. AT MID-POINT OF PERF. : 29.0
 PRES. AT RUN DEPTH : 0.0 DATUM DEPTH PRESS. : 0.0

NOTE : All above units in metric (Depth in metres cf; Pressure in KPAG)

ELEMENT SERIAL NO. : 18121N
 RANGE : 0 - 16200
 CAL. EQU. : 320.81 * Defl. + 10.17
 CLOCK RANGE : 180 HOURS
 LATEST CALIBRATION : 19/11/80

COMMENTS	TIME hrs	DEFL mm	PRESSURE KPAG			
			CALC	CORR	CORRECTED	MIDPNT
Depth : 1368.2 m-cf						
ON BOTTOM	0.00	29.650	9522.1	-1.9	9520.2	9549.2
FEB. 7 1342h.	4.00	29.653	9523.1	-1.9	9521.1	9550.1
	8.00	29.653	9523.1	-1.9	9521.1	9550.1
	12.00	29.653	9523.1	-1.9	9521.1	9550.1
	16.00	29.645	9520.5	-1.9	9518.6	9547.6
FEB. 8 0900h.	19.30	29.658	9524.7	-1.9	9522.7	9551.7
FLOW RATE #1	0.00	29.658	9524.7	-1.9	9522.7	9551.7
	.25	26.983	8666.5	.2	8666.7	8675.8
	.50	20.805	6684.6	2.8	6687.3	6716.3
	.75	20.722	6657.9	2.8	6660.7	6689.7
	1.00	21.764	6992.2	2.5	6994.7	7023.7
	1.50	22.659	7279.3	2.2	7281.5	7310.6
FEB. 8 1100h.	2.00	23.197	7451.9	2.0	7454.0	7483.0
SHUT IN	0.00	23.197	7451.9	2.0	7454.0	7483.0
	.25	28.445	9135.5	-1.0	9134.6	9163.6
	.50	29.052	9330.2	-1.4	9328.8	9357.8
	.75	29.231	9387.7	-1.6	9386.1	9415.1
	1.00	29.286	9405.3	-1.6	9403.7	9432.7
FEB. 8 1300h.	2.00	29.317	9415.3	-1.7	9413.6	9442.6
FLOW RATE #2	0.00	29.317	9415.3	-1.7	9413.6	9442.6

REMARKS :

GRADIENT OF 1.878 KPAG/M WAS USED TO EXTRAPOLATE TO MPP.
 GRADIENT WAS TAKEN FROM TEST DONE ON FEB. 7 1981.
 NO TOP CHART DUE TO CLOCK FAILURE.

SURVEY COMPANY : ALMECH SUBSURFACE TOOLS (1976) LTD. TEST BY : D.B.

SUBSURFACE PRESSURE MEASUREMENTS

20.5

COMPANY : PARAMOUNT RESOURCES LTD. WELL NAME : PARAMOUNT H.B. J-62
 DATE OF TEST : FEBRUARY 7 - 16, 1981 LOCATION : J-62
 EPTH : 1368.2 SERIAL NO. : 18121N

COMMENTS	TIME hrs	DEFL mm	PRESSURE KPAG			
			----- CALC	CORR	CORRECTED	MIDPNT
	23.55	.25	18.901	6073.7	3.4	6077.1 <i>HPA</i> 6106.1
	23.8	.50	18.634	5988.1	3.5	5991.6 6020.6
	24.05	.75	19.113	6141.7	3.3	6145.1 6174.1
	24.3	1.00	19.717	6335.5	3.1	6338.6 6367.6
	24.8	1.50	20.197	6489.5	3.0	6492.5 6521.5
FEB. 8 1500h.	25.3	2.00	20.062	6446.2	3.0	6449.2 6478.2
SHUT IN	25.3	0.00	20.062	6446.2	3.0	6449.2 6478.2
	25.55	.25	28.213	9061.1	-1.8	9060.3 9089.3
	25.8	.50	29.029	9322.9	-1.4	9321.4 9350.5
	26.3	1.00	29.213	9381.9	-1.6	9380.3 9409.3
	27.3	2.00	29.269	9399.9	-1.6	9398.2 9427.3
EB. 8 1700h.	27.3	0.00	29.269	9399.9	-1.6	9398.2 9427.3
LOW RATE #3	27.55	.25	13.641	4386.3	5.4	4391.6 4420.7
	27.8	.50	14.212	4569.5	5.1	4574.6 4603.6
	28.05	.75	14.221	4572.4	5.1	4577.5 4606.5
	28.3	1.00	14.631	4703.9	5.0	4708.9 4737.9
	28.8	1.50	14.517	4667.3	5.0	4672.3 4701.4
EB. 8 1900h.	29.3	2.00	14.831	4768.1	4.9	4773.0 4802.0
SHUT IN	29.3	0.00	14.831	4768.1	4.9	4773.0 4802.0
	29.55	.25	24.075	7733.6	1.8	7735.4 7764.4
	29.80	.50	28.540	9166.0	-1.0	9165.0 9194.0
	30.05	.75	29.283	9404.4	-1.6	9402.7 9431.7
	30.3	1.00	29.431	9451.8	-1.8	9450.1 9479.1
	31.3	2.00	29.594	9504.1	-1.9	9502.2 9531.2
EB. 8 2100h.	31.3	0.00	29.594	9504.1	-1.9	9502.2 9531.2
LOW RATE #4	31.55	.25	11.099	3570.8	5.8	3576.6 3605.6
	31.8	.50	12.189	3920.5	5.7	3926.2 3955.2
	32.05	.75	11.927	3836.4	5.7	3842.1 3871.1
WELL FREEZING OFF	32.3	1.00	11.982	3854.1	5.7	3859.8 3888.8
	32.55	1.25	10.287	3310.3	5.8	3316.1 3345.1
	33.3	2.00	13.840	4450.1	5.3	4455.4 4484.4
EXTENDED FLOW	34.3	3.00	14.040	4514.3	5.2	4519.5 4548.5
	34.8	3.50	13.677	4397.8	5.3	4403.2 4432.2
	35.05	3.75	13.617	4378.6	5.4	4384.0 4413.0
	35.3	4.00	23.918	7683.2	1.8	7685.0 7714.1
	35.8	4.50	28.445	9135.5	-1.0	9134.6 9163.6
	36.3	5.00	14.408	4632.4	5.1	4637.4 4666.4
	37.3	6.00	14.567	4683.4	5.0	4688.4 4717.4
	38.3	7.00	14.508	4664.4	5.0	4669.5 4698.5
	39.3	8.00	18.997	6104.5	3.4	6107.9 6136.9

SUBSURFACE PRESSURE MEASUREMENTS

20.6

COMPANY : PARAMOUNT RESOURCES LTD. WELL NAME : PARAMOUNT H.B. J-62

DATE OF TEST : FEBRUARY 7 - 16, 1981 LOCATION : J-62

DEPTH : 1368.2

SERIAL NO. : 18121N

COMMENTS	TIME hrs	DEFL mm	PRESSURE KPAG			
			CALC	CORR	CORRECTED	MIDPNT
	9.00	20.034	6437.2	3.0	6440.2	6469.2
	10.00	20.111	6461.9	3.0	6464.9	6493.9
	11.00	20.998	6746.5	2.7	6749.2	6778.2
	12.00	20.416	6559.8	2.9	6562.7	6591.7
	13.00	20.056	6444.3	3.0	6447.3	6476.3
	14.00	20.193	6488.2	3.0	6491.2	6520.2
	14.25	20.193	6488.2	3.0	6491.2	6520.2
	14.50	16.904	5433.1	4.1	5437.2	5466.2
	15.00	14.448	4645.2	5.0	4650.2	4679.3
	16.00	13.697	4404.3	5.3	4409.6	4438.6
	17.00	13.641	4386.3	5.4	4391.6	4420.7
	18.00	13.664	4393.7	5.3	4399.0	4428.0
	19.00	13.462	4328.9	5.4	4334.3	4363.3
	20.00	13.309	4279.8	5.5	4285.3	4314.3
	24.00	13.218	4250.6	5.5	4256.1	4285.1
	28.00	13.132	4223.0	5.5	4228.5	4257.6
	32.00	13.068	4202.5	5.6	4208.0	4237.1
	36.00	13.027	4189.3	5.6	4194.9	4223.9
	40.00	13.107	4215.0	5.5	4220.5	4249.5
	44.00	13.067	4202.8	5.6	4208.4	4237.4
	48.00	12.874	4140.2	5.6	4145.9	4174.9
	50.17	12.899	4140.3	5.6	4153.9	4182.9
	0.00	12.899	4148.3	5.6	4153.9	4182.9
	.25	22.504	7229.6	2.3	7231.9	7260.9
	.50	26.600	8569.3	.5	8569.8	8598.8
	.75	27.664	8885.0	-.3	8884.7	8913.7
	1.00	27.690	8893.3	-.3	8893.0	8922.0
	1.25	28.464	9141.6	-1.0	9140.6	9169.7
	1.50	28.532	9163.4	-1.0	9162.4	9191.4
	1.75	28.514	9157.7	-1.0	9156.6	9185.7
	2.00	28.399	9120.8	-.9	9119.8	9148.9
	2.50	28.313	9093.2	-.8	9092.3	9121.3
	3.00	28.192	9054.4	-.7	9053.6	9082.6
	4.00	28.228	9065.9	-.8	9065.1	9094.1
	5.00	28.288	9085.2	-.8	9084.3	9113.3
	6.00	28.353	9106.0	-.9	9105.1	9134.1
	8.00	28.500	9153.2	-1.0	9152.2	9181.2
	10.00	28.600	9185.2	-1.1	9184.2	9213.2
	14.00	28.762	9237.2	-1.2	9236.0	9265.0
	18.00	28.865	9270.3	-1.3	9269.0	9298.0

EB. 10 2310h.

SHUT IN

$a - vs. b = 9$
 $75' \cdot 9m =$
 13.41 psi
 92.5 Pa

SUBSURFACE PRESSURE MEASUREMENTS

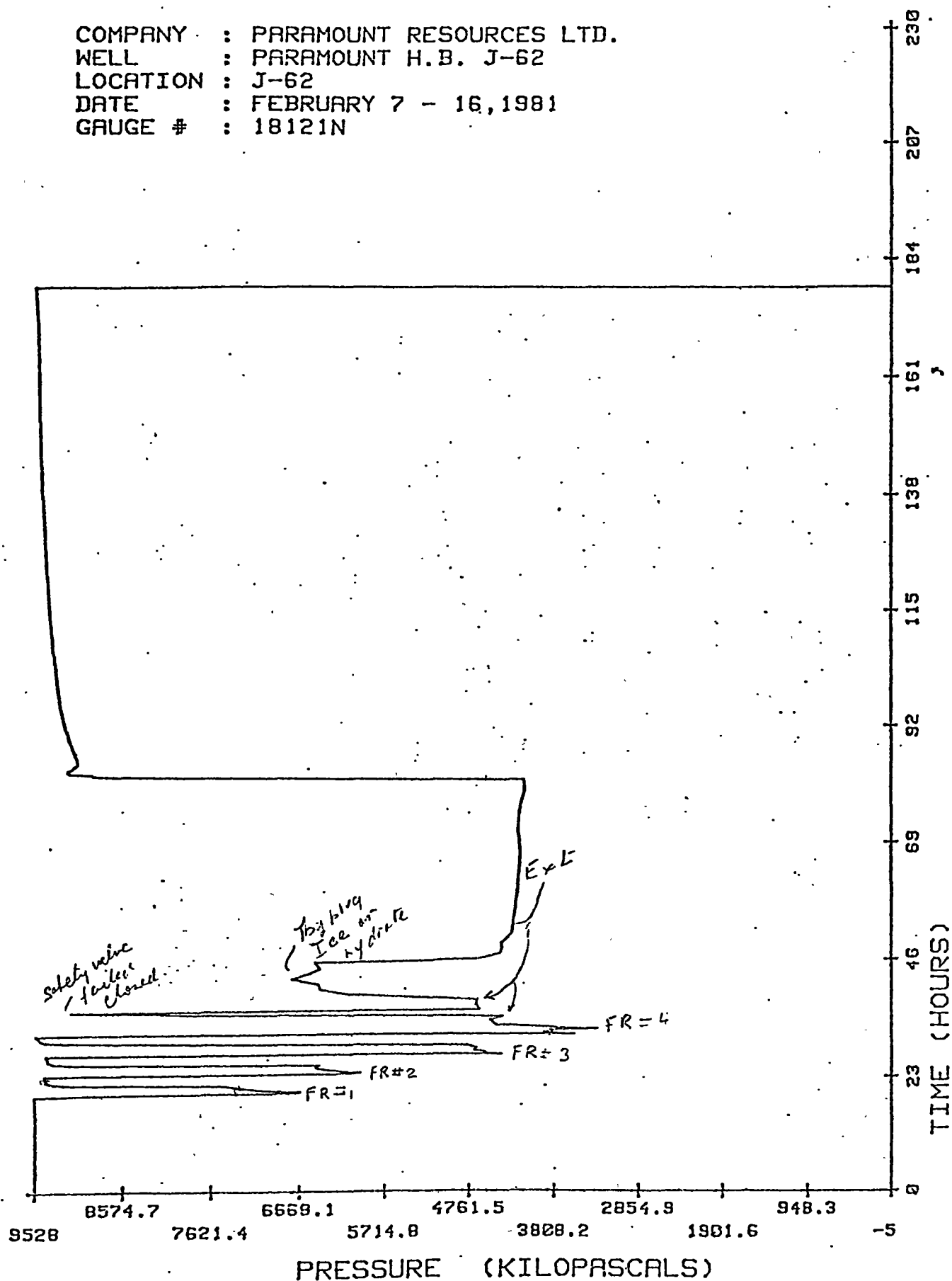
20.7

COMPANY : PARAMOUNT RESOURCES LTD. WELL NAME : PARAMOUNT H.B. J-62
DATE OF TEST : FEBRUARY 7 - 16, 1981 LOCATION : J-62
DEPTH : 1368.2 SERIAL NO. : 18121N

COMMENTS	TIME hrs	DEFL mm	PRESSURE KPAG			
			----- CALC	CORR	CORRECTED	MIOPNT
	108.47 26.00	29.016	9318.7	-1.4	9317.3	9346.3
	115.47 34.00	29.140	9358.5	-1.5	9357.0	9386.0
	123.47 42.00	29.222	9384.8	-1.6	9383.2	9412.2
	131.47 50.00	29.287	9405.6	-1.6	9404.0	9433.0
	139.47 58.00	29.361	9429.4	-1.7	9427.7	9456.7
	148.47 66.00	29.409	9444.8	-1.7	9443.0	9472.0
	155.47 74.00	29.445	9456.3	-1.8	9454.6	9483.6
	163.47 82.00	29.460	9461.1	-1.8	9459.4	9486.4
	171.47 90.00	29.485	9469.2	-1.8	9467.4	9496.4
CLOCK EXPIRED	178.47 97.00	29.565	9494.8	-1.9	9493.0	9522.0
OFF BOTTOM	0.00	0.000	10.2	-10.2	0.0	29.0
EB.16 1105h.	0.00	0.000	10.2	-10.2	0.0	29.0

20.8

COMPANY : PARAMOUNT RESOURCES LTD.
WELL : PARAMOUNT H.B. J-62
LOCATION : J-62
DATE : FEBRUARY 7 - 16, 1981
GAUGE # : 18121N



SUBSURFACE PRESSURE MEASUREMENTS

20.9

COMPANY : PARAMOUNT RESOURCES LTD.
 ADDRESS : CALGARY, ALBERTA.
 FIELD & POOL : SULFER POINT
 TYPE OF TEST : GRADIENT
 PROD. INT CF : 1381.4 to 1385.9
 LEV. (CF) : 751.9 (KB) : 755
 TOOL DATUM :

WELL NAME : PARAMOUNT H.B. J-62
 LOCATION : J-62
 STATUS : GAS
 DATE OF TEST : FEBRUARY 16, 1981.
 PROD. THROUGH : TUBING
 MID-POINT OF PROD. INT. CF : 1383.65
 DATUM DEPTH OF WELL CF : 0.00

STATIC TEST

TUBING PRES : 8384 KPAG
 CASING PRES : 0 KPAG
 RUN DEPTH TOP CF : 1381.7
 TEMPERATURE AT RUN DEPTH : 55.6 C
 GRAD. AT RUN DEPTH TOP : 1.416
 RES. AT RUN DEPTH TOP : 9507.4

SHUT-IN TIME : FEB. 10 2310h. 1981
 ON BOTTOM/OFF BOTTOM : 13:46 - 13:51
 SURFACE TEMPERATURE :
 PRES. AT MID-POINT OF PERF. : 9510.1
 DATUM DEPTH PRESS. : 0.0

NOTE : All above units in metric (Depth in metres cf; Pressure in KPAG)

ELEMENT SERIAL NO. : 18121N

RANGE : 0 - 16200

CLOCK RANGE : 3 HOURS

AL. EQUATION : $320.81 * Defl. + 10.17$ LATEST CALIBRATION : 19/11/80

TOP RECORDER DEPTH (M-cf)	DEFLECTION MM	CALCULATED PRESSURE KPAG	CORRECTION P + PC KPAG	CORRECTED PRESSURE KPAG	GRADIENT KPAG/M
-1.8	26.047	8366.2	1.0	8367.2	0.000
607.8	27.640	8877.3	-.3	8877.0	.836
1217.4	29.147	9360.7	-1.5	9359.2	.791
1290.2	29.333	9420.4	-1.7	9418.7	.818
1320.7	29.401	9442.2	-1.7	9440.5	.713
1351.2	29.475	9465.9	-1.8	9464.2	.776
1381.7	29.610	9509.3	-1.9	9507.4	1.416

REMARKS :

NO TOP CHART DUE TO CLOCK FAILURE.

SURVEY COMPANY : ALMECH SUBSURFACE TOOLS (1976) LTD. TEST BY : D.B.

INTERPRETATION BY : E. S. KYLE INSTRUMENT LTD.

CONTAINER IDENTITY

866

GAS ANALYSIS

LABORATORY NUMBER 21.1

9076-4-2543/1

LICENCE NO.

OPERATOR NAME AND ADDRESS

PARAMOUNT RESOURCES LTD.

CPA NUMBER

WELL NAME

PARAMOUNT HB ET AL CAMERON J-62-NWT

KB ELEVATIONS METRES GRD

755.00 751.94

FIELD OF AREA

POOL OR ZONE

NAME OF SAMPLER

COMPANY

CAMERON LAKE HILLS

SULPHUR POINT

S. BARKHOUSE

TESTMASTER

TEST RECOVERY

TEST TYPE NO.
☐ ☐
MULTIPLE RECOVERY ☐
EST INTERVAL FROM
TO m
PERFORATIONS FROM
TO m KB
1384.5
1389.0

SAMPLING POINT METER RUN
AMT & TYPE OF CUSHION
MUD RESISTIVITY @25°C
TYPE OF PRODUCTION
PUMPING ☐ FLOWING ☒ GAS LIFT ☐ SWAB ☐
PRODUCTION RATES
WATER TRACE m³/d OIL TRACE m³/d GAS 48.6 10³m³/d
GAUGE PRESSURE - kPa
SEPARATOR 190/310 TREATER RESERVOIR
TEMPERATURES °C
SEPARATOR 90/40 TREATER RESERVOIR
DATE SAMPLED DATE RECEIVED DATE REPORTED ANALYST
Y M D H M Y M D Y M D
1981-02-10 1981-02-19 1981-01-19 G. HOWE

COMP	MOL FRACTION AIR FREE AS RECD	MOL FRACTION AIR FREE ACID GAS FREE	LIQUID VOLUME ml m ³ AIR FREE AS RECD
H ₂	0.0000	0.0000	
H ₂	0.0008	0.0008	
N ₂	0.0445	0.0461	
CO ₂	0.0353	0.0000	
H ₂ S	0.0000	0.0000	
C ₁	0.8944	0.9273	
C ₂	0.0137	0.0142	
C ₃	0.0056	0.0058	20.49
iC ₄	0.0009	0.0009	3.91
nC ₄	0.0018	0.0019	7.54
iC ₅	0.0006	0.0006	2.92
nC ₅	0.0007	0.0007	3.37
C ₆	0.0008	0.0008	4.30
C ₇	0.0009	0.0009	5.41
C ₈			
C ₉			
C ₁₀			
TOTAL	1.0000	1.0000	47.94

GROSS HEATING VALUE MJ.m³ @ 15°C AND 101.325 kPa
(MOISTURE AND ACID GAS FREE)
MEASURED CALCULATED DEW POINT VAPOUR PRESS PENTANES PLUS
37.000 63.000
RELATIVE DENSITY
MOISTURE FREE AS SAMPLED MOISTURE AND ACID GAS FREE
MEASURED CALCULATED MEASURED CALCULATED
0.626 0.593
PSEUDO CRITICAL PROPERTIES (CALCULATED)
AS SAMPLED ACID GAS FREE
pPc pTc pPc pTc
4673.0 kPa 196.0 °K 4573.0 kPa 192.0

REMARKS

ON-SITE H₂S ANALYSIS BY TUTWILER
WAS 0.68% @ 1400K FEB 10 1981

DETERMINATIONS TO C7+ ONLY

COMPANY
WELL

Paramount Resources Ltd. ↓
Paramount HB et al Cameron J-62

PAGE 1 of 1
FILE 7011-81-77
DATE 1981 02 16

Sampled From: Separator Gas
Date Sampled: 1981 02 10

Analysis

Hydrogen Sulphide = 0.0068 mole fraction

Remarks

Hydrogen sulphide determined by Tutwiler.

(403) 278-9827
Telex 038-25541

CHEMEX
LABS (ALBERTA) LTD.

(403) 485-9877
Telex 037-41598

CONTAINER IDENTITY
PLASTIC BOTTLE

CONDENSATE ANALYSIS

LABORATORY NUMBER 22.1

9076-4-2543/3

LICENCE NO. 4

OPERATOR NAME AND ADDRESS

PARAMOUNT RESOURCES

CPA NUMBER

WELL NAME

PARAMOUNT HB ET AL CAMERON J-62-NWT

KB

ELEVATIONS
METRES

GRD

755.00

751.94

FIELD OF AREA
CAMERON HILLS

POOL OR ZONE

SULPHUR POINT

NAME OF SAMPLER

STAN BARKHOUSE

COMPANY

TEST MASTER

TEST RECOVERY

TEST TYPE NO.

MULTIPLE RECOVERY

EST INTERVAL
FROM

TO

TO

TO

PERFORATIONS
FROM

TO

TO

TO

SAMPLING POINT
SEPARATOR

AMT & TYPE OF CUSHION
MUD RESISTIVITY
@25°C

TYPE OF PRODUCTION
PUMPING ☐ FLOWING ☒ GAS LIFT ☐ SWAB ☐

PRODUCTION RATES
WATER TRACE m³/d OIL TRACE m³/d GAS 48.6 10³m³/d

GAUGE PRESSURE - kPa
SEPARATOR 1310 TREATER RESERVOIR

TEMPERATURES °C
SEPARATOR 40 TREATER RESERVOIR

DATE SAMPLED DATE RECEIVED DATE REPORTED ANALYST
Y M D H M Y M D Y M D
1981-02-10 1981-02-19 1981-02-19 G. HOWE

DMP	MOL FRACTION	MASS FRACTION	VOLUME FRACTION
N ₂	0.0000	0.0000	0.0000
CO ₂	0.0000	0.0000	0.0000
I ₂ S	0.0000	0.0000	0.0000
C ₁	0.0000	0.0000	0.0000
C ₂	0.0003	0.0001	0.0001
C ₃	0.0017	0.0005	0.0007
C ₄	0.0010	0.0004	0.0005
C ₄	0.0033	0.0012	0.0016
C ₅	0.0051	0.0024	0.0029
C ₆	0.0067	0.0031	0.0037
C ₆	0.0267	0.0149	0.0168
C ₇ +	0.9552	0.9774	0.9737
C ₈			
C ₉			
C ₁₀			
C ₁₁			
C ₁₂			
TOTAL	1.0000	1.0000	1.0000

PROPERTIES OF RESIDUE AT 15°C

RELATIVE DENSITY

ABSOLUTE DENSITY

RELATIVE MOLECULAR MASS

OBSERVED

CALCULATED

kg.m⁻³
CALCULATED

OBSERVED

CALCULATED

0.792

791

158

PROPERTIES OF TOTAL SAMPLE AT 15°C

RELATIVE DENSITY

ABSOLUTE DENSITY

RELATIVE MOLECULAR MASS

OBSERVED

CALCULATED

kg.m⁻³
CALCULATED

OBSERVED

CALCULATED

0.788

788

155

REMARKS

SAMPLE APPEARS TO CONTAIN GOOD PERCENTAGE DIESEL FUEL

DETAILED COMPONENT SUMMARY

22.2

PROJECT NO. 9076-4-2543/3
NAME PARAMOUNT RESOURCES
LOCATION PARAMOUNT HB ET AL CAMERON J-62-NWT
SAMPLE POINT SEPARATOR

COMPONENT	BOILING POINT(C)	MOLE FRACTION	MASS FRACTION	VOLUME FRACTION
NITROGEN	-196	0.0000	0.0000	0.0000
CARBON DIOXIDE	-79	0.0000	0.0000	0.0000
HYDROGEN SULPHIDE	-60	0.0000	0.0000	0.0000
METHANE	-162	0.0000	0.0000	0.0000
ETHANE	-89	0.0003	0.0001	0.0001
PROPANE	-42	0.0017	0.0005	0.0007
ISO-BUTANE	-12	0.0010	0.0004	0.0005
N-BUTANE	-1	0.0033	0.0012	0.0016
ISO-PENTANE	28	0.0051	0.0024	0.0029
N-PENTANE	36	0.0067	0.0031	0.0037
HEXANES	69	0.0267	0.0149	0.0168
HEPTANES	98	0.0369	0.0241	0.0265
OCTANES	126	0.0595	0.0434	0.0465
NONANES	151	0.0396	0.0323	0.0338
DECANES	174	0.0918	0.0819	0.0844
UNDECANES	196	0.0980	0.0943	0.0958
DODECANES	216	0.1270	0.1315	0.1322
TRIDECANES	236	0.1130	0.1241	0.1234
TETRADECANES	253	0.1174	0.1364	0.1347
PENTADECANES	271	0.0813	0.0993	0.0972
HEXADECANES	287	0.0466	0.0596	0.0580
HEPTADECANES	302	0.0309	0.0422	0.0409
OCTADECANES	317	0.0138	0.0199	0.0191
NONADECANES	331	0.0082	0.0124	0.0119
EICOSANES	344	0.0048	0.0079	0.0076
HENEICOSANES	357	0.0022	0.0037	0.0036
DOCOSANES	369	0.0024	0.0042	0.0040
TRICOSANES	380	0.0021	0.0037	0.0035
TETRACOSANES	391	0.0013	0.0025	0.0023
PENTACOSANES	402	0.0008	0.0015	0.0014
HEXACOSANES	412	0.0005	0.0010	0.0009
HEPTACOSANES	422	0.0002	0.0005	0.0005
OCTACOSANES	432	0.0001	0.0002	0.0002
NONACOSANES	441	0.0001	0.0001	0.0001
TRIACONTANES+	449	0.0001	0.0001	0.0001
BENZENE	49	0.0005	0.0002	0.0002
TOLUENE	111	0.0083	0.0050	0.0043
XYLENE	139	0.0416	0.0285	0.0246
1,2,4-TRIMETHYLBENZENE	171	0.0062	0.0050	0.0043
CYCLOPENTANE	49	0.0003	0.0001	0.0001
METHYL CYCLOPENTANE	72	0.0034	0.0019	0.0019
CYCLOHEXANE	81	0.0046	0.0025	0.0024
METHYL CYCLOHEXANE	101	0.0117	0.0074	0.0073
TOTALS		1.0000	1.0000	1.0000

CALGARY
2021 - 41 Avenue NE
Calgary, Canada T2E 6P2
(403) 278-9627
Telex 038-25541

CHEMEX
LABS (ALBERTA) LTD.

EDMONTON
6112 Davies Road
Edmonton, Canada T6E 4...
(403) 483-9877
Telex 037-41608

CONTAINER IDENTITY

PLASTIC BOTTLE

OIL ANALYSIS

LABORATORY NUMBER 23.

9076-4-2543/4

LICENCE NO

OPERATOR NAME AND ADDRESS

PARAMOUNT RESOURCES LTD.

CPA NUMBER

WELL NAME

PARAMOUNT HB ET AL CAMERON J-62-NWT

ELEVATIONS

KB 755.66

751.5

FIELD OF AREA

CAMERON HILLS

POOL OR ZONE

SULPHUR POINT

NAME OF SAMPLER

STAN BARKHOUSE

COMPANY

TEST MASTER

TEST RECOVERY

TEST TYPE - NO

MULTIPLE RECOVERY

EST INTERVAL

FROM

TO

PERFORATIONS

FROM

TO

SAMPLING POINT

SEPARATOR

AMT & TYPE OF CUSHION

MUD RESISTIVITY

TYPE OF PRODUCTION

PUMPING

FLOWING

GAS LIFT

SWAP

PRODUCTION RATES

WATER

TRACE

ml/d

OIL

TRACE

ml/d

GAS

46.6

10³ m³/d

GAUGE PRESSURE kPa

SEPARATOR

1310

TREATMENT

RESERVOIR

TEMPERATURES °C

SEPARATOR

40

TREATMENT

RESERVOIR

DATE SAMPLED

Y M D HM

81 02 10

DATE RECEIVED

Y M D

81 02 19

DATE REPORTED

Y M D

81 02 19

ANALYST

G. HOWE

SAMPLE PROPERTIES

VOLUME FRACTION

COLOR OF CLEAN OIL

BLACK

WATER

HS

TOTAL BS & W

DENSITY

RELATIVE

ABSOLUTE kg m⁻³

AS RECEIVED

0.794

AFTER CLEANING

AS RECEIVED

793

AFTER CLEANING

TOTAL SULPHUR
MASS FRACTION

0.002

TOTAL SALT
g m⁻³

POUR POINT °C

US BM

ASTM

CARBON RESIDUE

CONRADSON

RAMSBOTTOM

VISCOSITY

TEMP °C

DYNAMIC
mPa s

KINEMATIC
mm² s⁻¹

DISTILLATION

BAROM PRESS
kPa

METHOD

D-86

92.79

ROOM TEMP °C

21

INITIAL BOIL PT °C

47

DISTILLATION SUMMARY
VOLUME FRACTION

204 °C NAPHTHA

0.53

274 °C KEROSENE

0.88

343 °C LIGHT GAS/OIL

0.92

RECOVERED

0.92

RESIDUE

0.05

DISTILLATION LOSS

0.03

RELATIVE DENSITY

DISTILLATE

RESIDUE

SALE TYPE

CHARACTERIZATION
FACTOR

VOLUME FRACTION DISTILLED	TEMP °C
.05	105
.10	125
.15	140
.20	150
.25	160
.30	170
.35	177
.40	185
.45	192
.50	200
.55	208
.60	215
.65	223
.70	230
.75	238
.80	245
.85	260
.90	282
.92	288
FBP	
CRACKED	

REMARKS

CALGARY
21 - 41 Avenue NE
Calgary, Canada T2E 8P2
(403) 276-9827
Telex 038-26541

CHEMEX
LABS (ALBERTA) LTD.

EDMONTON
8112 Davies Road
Edmonton, Canada T6E 4W4
(403) 486-9877
Telex 037-41698

CONTAINER IDENTITY

PLASTIC

LICENCE NO

OPERATOR NAME AND ADDRESS

LABORATORY NUMBER 24.

9076-4-2543/2

PARAMOUNT RESOURCES

WELL NAME

PARAMOUNT H.B. ET AL CAMERON J-62-N.W.T.

ELEVATIONS
METRES
KB 755.00 QA 751.94

FIELD OF AREA

AMERON HILLS

POOL OR ZONE

SULPHUR POINT

NAME OF SAMPLER

STAN BARKHOUSE

COMPANY

TESTMASTER

TEST RECOVERY

TEST TYPE NO.

TYPE RECOVERY

TEST INTERVAL

FROM

TO

OPERATIONS

FROM

TO

SEPARATOR

SAMPLING POINT

AMT & TYPE OF CUSHION

MUD RESISTIVITY

@ 25°C

PUMPING

FLOWING

TYPE OF PRODUCTION

GAS LIFT

SWAB

PRODUCTION RATES

WATER TRACE m³/d

OIL TRACE m³/d

GAS 46.6 10³ m³/d

GAUGE PRESSURE - kPa

SEPARATOR

TREATER

RESERVOIR

1310

SEPARATOR

40

TREATER

RESERVOIR

DATE SAMPLED

DATE RECEIVED

DATE REPORTED

ANALYST

Y M D H M

Y M D

Y M D

1981-02-10

1981-02-19

1981-02-20

R.S & G.R

ION	C g m ⁻³	MASS FRACTION	C mol m ⁻³
Na	2300		100
K	2900		74
Ca	520		22
Mg	180		8
Br			
Fe	2		<1

ION	C g m ⁻³	MASS FRACTION	C mol m ⁻³
Cl	7000		197
Br			
I			
HCO ₃	1552		25
BO ₄	2150		22
CO ₃			<1
OH			<1
H ₂ S	PRESENT		

TOTAL SOLIDS C/g m⁻³

BY EVAPORATION

@ 110°C

BY EVAPORATION

@ 180°C

AT IGNITION

15945

CALCULATED

16604

RELATIVE DENSITY

1.012 @ 21°C

REFRACTIVE INDEX

1.340 @ 25°C

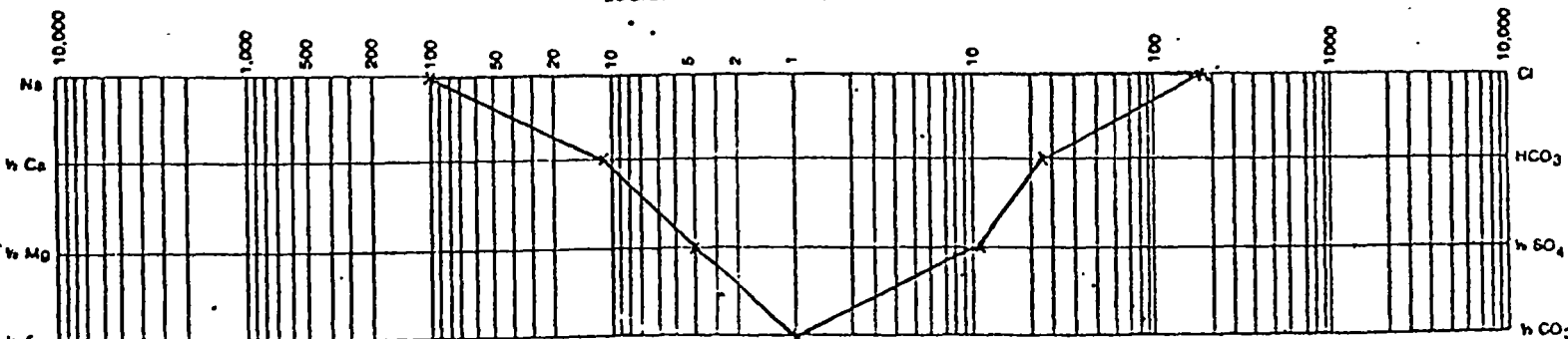
OBSERVED PH

7.8 @ 21°C

RESISTIVITY Ω.m

0.666 @ 25°C

LOGARITHMIC PATTERN C/mol m⁻³



REMARKS

MACDONALD ENGINEERING & ASSOCIATES (1980) LTD.

NOMENCLATURE

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>FIELD</u>	<u>UNITS</u>	
			<u>METRIC (SI)</u>	
a, a_t	Coefficients in the transient form of the deliverability equation	$\frac{\text{psia}^2}{(\text{cp})(\text{MMscfd})}$	$\frac{\text{mPa}^2}{(\text{Pa.s})(\text{m}^3/\text{d})}$	
A	Drainage area	ft^2	m^2	
AOF	Absolute open flow potential of a well or the deliverability against a zero sandface pressure	MMscfd	m^3/d	
b	Coefficient in the stabilized deliverability equation	$\frac{\text{psia}^2}{(\text{cp})(\text{MMscfd})^2}$	$\frac{\text{mPa}^2}{(\text{Pa.s})(\text{m}^3/\text{d})^2}$	
B	Formation volume factor	-	-	
c	Compressibility of any substance	psia^{-1}	kPa^{-1}	
$\bar{c}$	Compressibility of a gas at average conditions	psia^{-1}	kPa^{-1}	
c_f	Formation compressibility	psia^{-1}	kPa^{-1}	
c_g	Gas compressibility	psia^{-1}	kPa^{-1}	
c_o	Oil Compressibility	psia^{-1}	kPa^{-1}	
c_w	Water compressibility	psia^{-1}	kPa^{-1}	
c_t	Total effective compressibility	psia^{-1}	kPa^{-1}	
C	Coefficient in the deliverability equation	-	-	
C_{sd}	Dimensionless wellbore storage constant	-	-	
FE	Flow efficiency	-	-	
G	Relative density of a gas	-	-	
h	Net formation thickness	ft	m	
k	Reservoir permeability	md	mD	
kh	Permeability thickness of a formation	md.ft.	mD.m	
m	Slope of the semilog straight line	$\frac{\text{psia}^2/\text{cp}}{\text{cycle}}$	$\frac{\text{mPa}^2/(\text{Pa.s})}{\text{cycle}}$	
MBH	Abbreviated form of Matthews, Brons and Hazelbroek	-	-	
MDH	Abbreviated form of Miller, Dyes and Hutchinson	-	-	

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>FIELD</u>	<u>UNITS</u>	
			<u>METRIC (SI)</u>	
n	Reciprocal slope of the deliverability line	-	-	-
PI	Productivity index	mscfd/psi	m ³ /d/kPa	
P _c	Pseudo-critical pressure	psia	kPa	
P _f	Flowing reservoir pressure at any position in the reservoir, except at the external boundary	psia	kPa	
P _i	Initial stabilized shut-in pressure in a new reservoir	psia	kPa	
P _r	Pseudo-reduced pressure	-	-	
$\bar{P}_R$	Stabilized shut-in reservoir pressure	psia	kPa	
P _{tf} , P _d	Flowing wellhead pressure	psia	kPa	
P _{ts} , P _w	Static wellhead pressure	psia	kPa	
$\bar{P}_{ts}$	Stabilized shut-in wellhead pressure	psia	kPa	
P _{wf} , P _s	Flowing bottom hole pressure	psia	kPa	
P _{ws} , P _f	Static bottom hole pressure	psia	kPa	
p*	Hypothetical reservoir pressure	psia	kPa	
P _{1hr}	Extrapolated pressure corresponding to a 1 hour shut-in time on a Horner Plot	psia	kPa	
q	Flow rate	MMscfd	m ³ /d	
r _d	Effective drainage radius	ft	m	
r _e	Radius of external boundary	ft	m	
r _{inv}	Radius of investigation	ft	m	
r _w	Well radius	ft	m	
s	Skin factor	-	-	
s'	Apparent skin factor	-	-	
t	Flowing time	hr	h	
t _c	Corrected time of flow	hr	h	

<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>FIELD</u>	<u>UNITS</u>	
			<u>METRIC (SI)</u>	
t_s	Time to stabilization	hr	h	
t_{ws}	Time for wellbore storage effects to become negligible	hr	h	
T	Reservoir temperature	$^{\circ}R$	K	
T_c	Pseudo-critical temperature	$^{\circ}R$	K	
T_r	Pseudo-reduced temperature	-	-	
t^*	Modified time	hr	hr	
Δt	Shut-in time	hr	h	
Z	Compressibility factor of a gas	-	-	
μ_g	Gas viscosity	cp	μ Pa.s	
μ_o	Oil viscosity	cp	m Pa.s	
$\bar{\mu}$	Gas viscosity at average conditions	cp	μ Pa.s	
ϕ	Porosity of the medium	-	-	
ψ	Pseudo-pressure	$\frac{psia^2}{cp}$	$\frac{mPa^2}{Pa.s}$	

ERCB GUIDE G-3 - Energy Resources Conservation Board
 "Gas Well Testing - Theory and Practice"
 Fourth Edition 1979 (Metric)